PACKAGE engineering

Conceiving and installing a new package

It takes skill and patience to get a new package out of the idea stage and into actual production — including the task of convincing the rest of the company of its effectiveness. (See Page 7)

Using men as packaging machine attendants

An experienced production manager comes up with some convincing reasons for letting mechanically-minded men (instead of women) operate packaging line machinery on a full time basis. (See Page 12)

Current developments in multiwalls

An industry-wide view of present usage and future trends in multiwall paper shipping sacks — with emphasis on structural and functional characteristics. (See Page 16)

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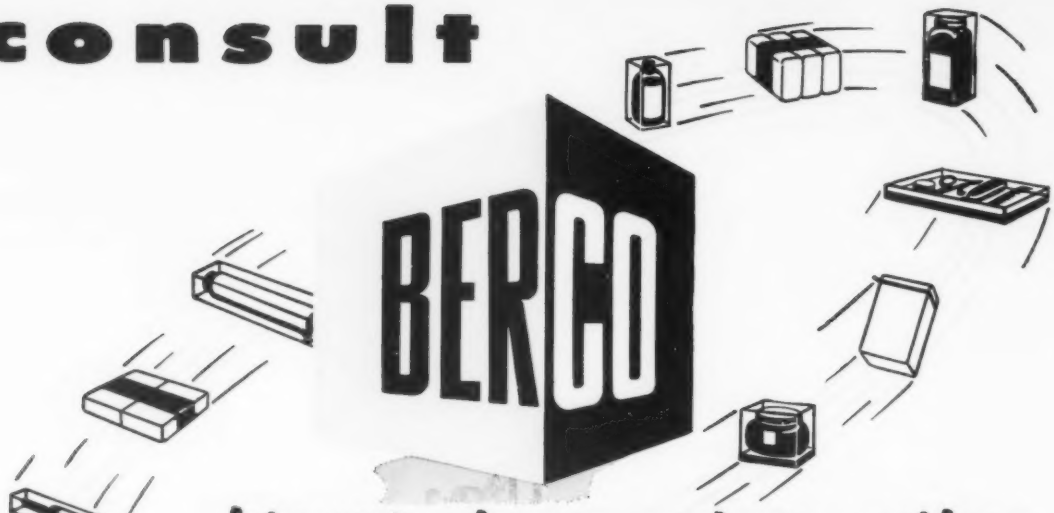

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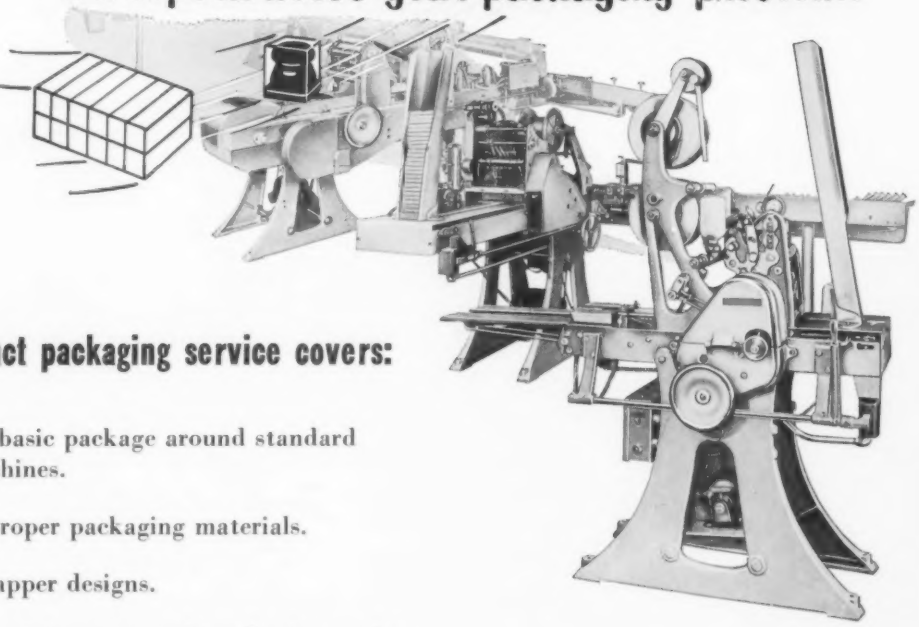

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PACKAGE engineering

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A look ahead

Day by day, Packaging Institute is putting the finishing touches on what appears to be a well-rounded program for its 18th Annual Forum. All of the sessions will feature speakers of distinct competence in their respective fields. However, several sessions should prove particularly informative and helpful.

No one concerned with food packaging should miss the seminar on protective packaging for the armed forces. The principal speakers are some of the specialists attached to the Quartermaster Food and Container Institute. Their presentations on simplified logistics, radiation preservation, and packaging for aerial delivery represent some of the most forward thinking in the field of packaging. Much of what they are now doing for the military will ultimately find its way into consumer packaging.

An unusual session will be that devoted to the dynamics of protective packaging. Recognized specialists will discuss the biotics, climatics, mechanics and chemicals of protective packaging. These talks entail discussion of mold and bacteria, problems of changes in temperature, water vapor and moisture, package and material testing, and the reactions between packaging materials and package containers.

One entire day will be devoted to a flexible packaging seminar. Speakers (largely from supplier companies) will discuss such topics as vacuum and gas flexible packaging, functional coatings, functional properties of packaging structures — as well as detailed reviews of individual flexible packaging materials.

— R. B. H.

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A note from the Publisher

Some months ago I asked the director of research of a large Chicago packer what factors his plant considered when investigating a new packaging material. His answer was that there were many, but that a change would be made only if a different packaging material would do as good a packaging job at less cost, or a better packaging job at the same cost. If the cost of the material under consideration would increase their packaging cost, it had to improve their package sufficiently to justify the higher cost.

The same thinking was expressed in an ad in our July issue — but from the supplier's point of view — as follows: "Almost anybody can improve your package by increasing your packaging costs. Almost anybody can save you money by giving you inferior packaging design."

The latter point is frequently seen in the purchase of corrugated shipping containers. The buyer demands lower cost, and the supplier reduces the test of the board, thus reducing both the cost of the container *and* the strength, to meet a price.

Obviously, therefore, if both the supplier and the buyer would keep these thoughts in mind, it would work to their mutual advantage.

Generally speaking, the package user is well aware of the characteristics of his product to be considered in the selection of the packaging material best suited for it, but is not so aware of the characteristics of the various packaging materials. He knows whether his product is affected by moisture, by heat and light, whether it picks up or loses odors, etc. The package supplier, on the other hand, knows about the properties of the various packaging materials, but less about the product to be packaged. While this is a generally accepted fact, particularly in smaller companies, there are, of course, many outstanding exceptions.

Therefore, when you are planning a new package or considering changing a supplier, it is important to give the supplier all the facts about your product — including shelf life required, temperature and humidity conditions it might experience between your plant and the consumer — to enable him to make an intelligent recommendation. Many a package that looked good in the package development lab failed because the converter was not given all the facts, or the samples of the products submitted were not typical of production line runs.

Just bear in mind: "Almost anybody can improve your package by increasing your packaging cost, and almost anybody can save you money by giving you an inferior package" — but to make a change of material or supplier worthwhile, you must get the same package performance you are now getting but at less cost — or — if the cost is higher, there should be a corresponding increase in package performance.

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PACKAGE engineering

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Eastern advertising sales office:
P. O. Box 270
Ocean City, New Jersey
Telephone: Ocean City 3519

Package Engineering is published monthly by Angus J. Ray Publishing Company, 1791 West Howard Street, Chicago 26, Illinois. Angus J. Ray, president; R. B. Holmgren and I. F. Megargee, vice presidents; James G. Culbertson, secretary and Ethyl K. Ray, treasurer. Please address articles for publication and correspondence regarding the editorial content to the editor. Statements and opinions expressed in articles and editorials are those of the respective authors, for which Package Engineering assumes no responsibility.

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Accepted as controlled circulation publication at Aurora, Illinois.

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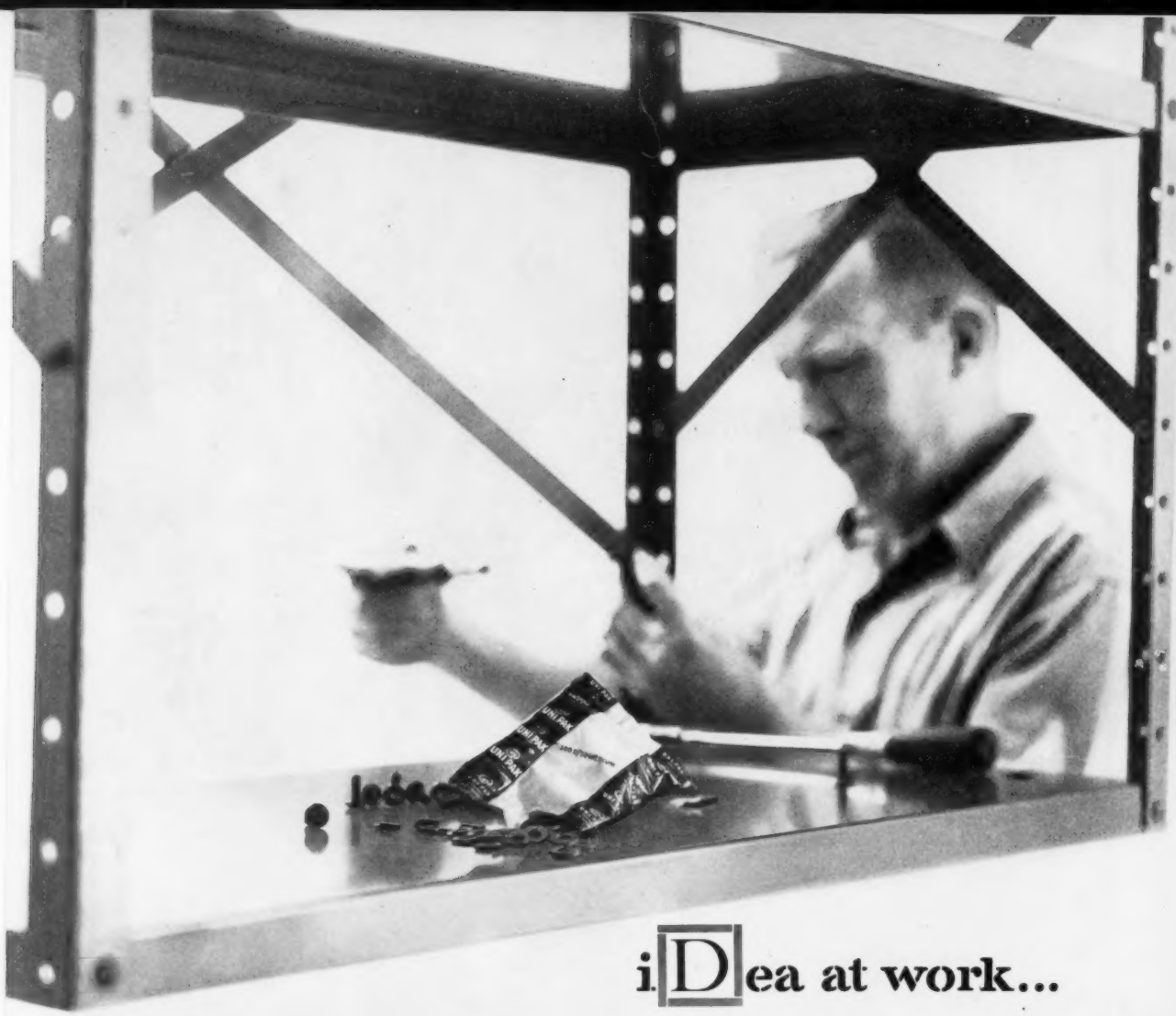

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Halden L. Lewis is now engaged in the organization, development and operation of his company's staff packaging engineering department. Before joining Corning Glass Works five years ago he held executive positions in mechanical production liaison, plant layout and quality control engineering. He attended Lowell Institute, M. I. T. and Wentworth Institute. He is a member of Packaging Institute and SIPMHE and is an associate member of Sigma Xi and New York State Society of Professional Engineers. He is a visiting lecturer of Purdue University's Institute for Packaging Personnel.

The engineering of a package

By Halden L. Lewis,
Corning Glass Works,
Corning, New York

This unusually complete narrative of know-how traces not only the objective development of a package but also the subjective experiences of its sponsors. Further, this article is a candid review of the difficulties and compromises entailed in getting a new package into actual production to the satisfaction of all departments — and without losing the savings and advantages originally expected.

"What's the matter with the present package? It has proved itself through many years of use without change. Our customers appear to like it, for they have not complained. Our production people have not found fault with it. The cost is not out of line when compared with our other products. Competition uses substantially the same package and has done so for at least as long as we have. So, what's the matter with the present package?"

How many times have you encountered this train of thought? How many times have you used these arguments to maintain the status quo? I imagine these identical thoughts have been expressed in connection with almost everything on the face of the earth that can be altered by man: It's all right; leave it alone; it was good enough for our fathers and it's good enough for us. If this negative thinking continues, we go on and on, sinking deeper into the stagnation of inertia that resists any change for either better or worse.

Management cannot view anything in this manner. To do so would set the stage for competition to enter and steal our hard-won gains which are the rewards of its continuous search for better ways of doing things. If we were to select the one question continuously uppermost in the mind of management, I believe it would be: "What can we do to reduce costs?"

In spite of the effective search that management has made to find answers to its cost question, expense of both materials and labor has gone up, is going up and probably will continue to go up. This rise would have been considerably higher had it not been for management's aggressive search for more economical ways of doing things.

Cutting Costs 35 Per Cent

By helping to answer management's uppermost question, our package engineering department has been instrumental in reducing costs by over 35 per cent for the packaging of "Pyrex" pie plates. In addition, there have resulted intangible bonuses in the form of reductions in the physical volume of packing materials handled and simplification of the packing operation. While these intangibles were not the deciding factors in the acceptance of this package, there are other cases where intangibles may become more important than the actual dollar savings.

The pie plate package, together

By reversing part of a stack of pie plates the Corning engineers came up with a way to have the tops at both exposed ends, thus keeping the vulnerable bottoms *within* the stack, as at left. Stack at right represents the predecessor of the new packaging arrangement.

with a number of other packages, was checked for cost reduction potential. Of the dozen or so examined, this package appeared least susceptible to improvement because it was basically so simple; just a carton containing a dozen pie plates separated from each other by a sheet of Shocksorb.

Since there didn't appear to be much we could do to improve a package as simple as this, we first tackled other packages that looked more promising. Our first impression was that nothing obvious could be done, but it certainly didn't mean that *nothing* could be done.

Planning A Program

We took another, closer look at this pie plate package to see what could be done to remove some of the cost. To make this effort most effective, our program followed four steps:

1. Review the history of the package and the product.
2. Search for a better combination of product and packing materials.
3. Develop a new package based on our search and experimental testing.
4. Introduce the new package to production, and follow to acceptance.

As the first step in our program, we checked the history of our pie plate package. Prior to 1942 our pie plates were packed in individual containers. At that time the domestic package was changed to the 12-piece Shocksorb bulk pack which was used until the beginning of 1955. The individual package was kept for foreign shipments until 1946 when that too was changed to the bulk pack. During the war years many substitute materials were used but no new packages were developed.

Product Itself Improved

In the period of time covered by this pie plate package, the *product* had most certainly improved. Our recent advertisement in *Life* magazine says, "And new Pyrex Bakingware is stronger than ever. It's tempered (as steel is) by an exclusive Corning process to resist chipping . . . . crazing . . . . high oven heat."

After reviewing the history of the product we were sure there had been many improvements in it and in the packing materials themselves since the last major packaging change. Why should our product, which is much stronger than ordinary glass, need a highly cushioned package? Why should we continue to use packaging materials that may have been improved to the point where they are better than necessary for our improved product? By now there must be a better combination available.

In the second step in our program, it was noted that the pie plate pack, in its 175# carton, weighed less than 20#. Here was a possible point of attack since Rule 41 only requires 125# corrugated board in the carton. Some time ago it appeared that the board could be reduced to 125# but many reasons were found why this action was not taken.

Experience showed that 125# cartons did not pass through automatic case sealers satisfactorily. The cartons were too light; they stuck and tore. In addition, the 125# carton did not have sufficient stacking strength to stand up well in warehousing. These conditions appeared to be well founded but, because they were explored some time ago, we felt it advisable to have another try at their elimination.

How Light A Separator?

Because our product was so strong, we believed we could use a lighter separator between the individual plates. The danger of scuffing prohibits their complete elimination. The question then became, "How light can the separators be and still provide minimum scuff resistance?"

Regardless of how light the separators could be made, they must be of a material that was readily obtainable

and at the same time inexpensive. We found two types of paper that could be used. They were newsprint and .009 chip, which is often used as the corrugating medium in the manufacture of corrugated paper. Upon close examination newsprint appeared too light, so we decided to use .009 chip and turned to the purchasing department for availability, price and delivery. We were assured there would be no problem here, we went ahead.

Step three was the development of the new package. Each part of this step is highlighted briefly in the tabulated list of tests made. You will find them numbered from 1 to 10 in the tabulation.

Line 1 shows the Shocksorb package which was in use until early 1955; Line 10 shows the newly developed "split pack." Those in between show the various ideas tried en route to the final package. The percentage cost reductions are based on the Shocksorb package.

Estimating Savings

From developments in the second step of our program, we decided our first trial package would be the one shown on Line 2. The carton was made of 125# DF corrugated board, and the separators were .009 chip. Our estimate of the cost reduction available in this pack was 44 per cent, which was well worth going after.

In addition to the cost reduction, the volume of the finished package would be down about 24 per cent, and packing material volume would be reduced. The use of a lighter, smaller carton and lighter interior parts, along with the reduced volume of the finished package, would result in a substantial reduction in warehousing and material handling. These were two bonus reductions not originally anticipated but always welcome, as they would lessen both labor and area requirements.

As noted on Line 2, our first package failed on the last Rule 41 drop. This seemed to indicate we were on the verge of something good, so we gave the new package a thorough examination. The only thing we could find was that the carton was somewhat small because .009 chip did not compress as much as we first thought it would.

Loose Versus Tight

Line 3 indicates our second try. In this one we found out how the product tested in a looser package. This package failed too. A study of the failure revealed nothing new but we felt we should try one that had a still better fit. We had gone too far and made the package too loose.

A package must be neither too loose nor too tight. If it is too loose the product will have an opportunity to move sufficiently inside the carton to produce damaging impacts. If it is too tight some of the cushioning will be used in the compression of the packaging materials at the time it is packed and closed. The problem of getting just the right size carton is extremely important because as we know, manufacturers are unable to make cartons or products which are alike to extremely close tolerances.

Because plate #12 failed in the first pack and #11 in the second, the weakness appeared to be in the bottom of the package. To check this, we decided to change the sequence of the drops in the next test as well as reduce the depth of the carton. On Line 4 it will be noted the failure appeared earlier; this supported our observation regarding the location of the weakest part of the package, and also showed that a better carton fit was not the answer.

Our failures to this point indicated a need for more cushioning so we cast around for an inexpensive way to gain this end. Another cost check showed we could use two sheets of .009 chip in place of one and still make a saving of 28 per cent. This is not the most desirable method of adding cushioning, because the packages might be assembled with only one sheet and result in a potentially weak package. In addition, more supervision might be required to make sure the right number of sheets would be assembled in the package.

Make Packaging Compromise

The addition of another sheet of .009 chip was also our first compromise of the basic packaging idea we had decided to investigate. As in most other fields of endeavor, we must be ready to compromise when it is the only way to attain a goal. Most everything consists of some kind or

Tests Made In The Development Of The "Split Pack" Pie Plate Package

No.	Carton size	Board	Interior	Observation (1)	Reduction
1.	9½ x 9½ x 6⅝ RSC	175# DF	Shocksorb	Shocksorb pack. No breakage	—
2.	9½ x 9½ x 5 RSC	125# DF	.009 chip	#12 failed on 10th drop	44%
3.	9½ x 9½ x 5½ RSC	do	do	#11 failed on 9th drop	43%
4.	9½ x 9½ x 5¼ RSC	do	do	#11 & 12 failed on 4th drop	43%
5.	9½ x 9½ x 5¼ RSC	do	2 Pcs. .009 chip	#12 failed on 8th drop	28%
6.	9½ x 5¼ x 9½ FFSC	do	.009 chip	#12 failed on 9th drop. (2)	40%
7.	9½ x 9½ x 5¼ RSC	175# DF	do	#12 failed on 7th drop	29%
8.	9½ x 9½ x 6⅝ RSC	125# DF	Shocksorb	No breakage	5%
9.	9½ x 9½ x 6⅝ RSC	do	.009 chip	No breakage. "Split pack"	40%
10.	9½ x 9½ x 6⅜ RSC	175# DF	do	No breakage. Final "split pack"	35%

(1) The plates were numbered from one to twelve from the top and all plates were placed in the package facing up except in test #6.

(2) In this package the bottom of the stack of plates did not rest on the bottom of the carton, but the same numbering system was used to identify breakage.

degree of compromise hence it is not strange it is found in packaging.

On Line 5 it will be noted this test also ended in failure. The two sheets of .009 chip did not have enough cushioning to absorb the shocks encountered. The accumulated forces still pass right through the entire stack of plates to the bottom one which failed on impact. By this time it was pretty obvious the bottom of our package did not have sufficient cushioning for our product.

We took a searching look at Rule 41 to see if we could find a new interpretation which might assist us. We noted that the rule only calls for drops on the top and bottom faces and the eight edges attached thereto. Would it be possible to relocate the carton openings to obtain a new test pattern which would be equivalent to more cushioning? What would happen if we opened the sides of the carton instead of the top and bottom and also provide full flaps.

Failures Show Up

Line 6 shows the results of the test made with an FFSC. As in the case of the other tests, it too ended in failure. From this it was apparent that, by making the flat drops on the side instead of the bottom of our product, little was done to improve the shock absorbing characteristics of the package, even with the addition of the full flaps. The full flap idea was not tested directly on an end opening carton because it was relatively simple to check it by dropping an RSC on an additional sheet of corrugated paper.

On Line 7 we found ourselves making another attempt at a compromise to salvage what we could of our potential savings. If we could not make a successful package in a 125# carton, why not try one in the 175# carton? This actually didn't look very promising in the light of our previous failures, but perhaps we might be able to learn something which could be applied to still another package. At this point we were beginning to grasp at straws in an effort to salvage something from the failures of our tests. This package failed too, and nothing was gleaned from the failure.

Line 8 shows the result of still another compromise. If the heavier 175# carton would not provide enough additional cushioning, then perhaps we could go back to the 125# carton and again use Shocksorb for the cushioning. There was very little saving involved in this approach, only five percent, but by now a little saving was better than none at all. As a package this was successful but our savings were mostly "compromised" away.

Study Of Tests

Before giving up we reviewed what we had learned about our package to see if something could be gained from the results of our tests. Knowing our failures, we studied these to find a clue to a new approach which might lead us to a satisfactory package. By listing the things we knew, we could study in detail the specific area or areas in which we believed our failures lie.

Following is a brief listing of the points we believed to be of major importance:

1. The weakest point in our product was the bottom edge where the side wall blends into the bottom.

2. The top edge or rim of our product was considerably stronger than the bottom edge.

3. Failures were due to lack of cushioning we cannot afford to provide.

From this it appeared we should do something with or to the product and not the package, as economics did not permit us to do anything to the package (with the exception of the five per cent reduction shown on Line 8).

Perhaps, we thought, we should have provided more cushioning for the bottom of the package, but that would not be desirable because there would be more cushioning in one end of the package than in the other. This might solve the problem, but what would happen if the packers put the extra cushion in the wrong end of the package? Of course, we could put extra cushioning in both ends, but that would be a waste of labor and materials.

Eliminate The Bottoms?

What we actually needed to do was to eliminate the bottom of the stack of ware because that was where the weakness existed. We could not do this because everything has a top and bottom and . . of . . course . . . our package . . . . . is . . . . . no . . . . . exception. Now hold everything! The spark of a new idea was just conceived:

Of course, we couldn't stack up a column of pie plates without a bottom, but we could split a column containing twelve pieces into two columns of six each. If we stacked these beside one another there were two columns and two bottoms. If we turned one column upside down and put the other on top we had one column as before, but the weak bottoms of the plates were now in the center of the pack.

We now had a new combination of product and packing materials. It should work well, for in addition to putting the weakest part of the product in the center where it couldn't get any heavy impacts, we had split the mass in two — thus reducing the effective mass that had been causing the failures.

The carton would have to absorb a greater part of the impact loads by actually deforming at the time of impact. We had to find out if a 125# carton would take that kind of punishment. We had lost the volume reduction we were after in the final package, but if this idea worked, we were willing to accept this compromise.

With this new combination of our product and available packaging materials we went back to what we first considered the bare essentials, and used the 125# carton and .009 chip for the separators. This was where we started on Line 2 with the exception that the mass was now split in two. We shall designate this package the "split pack".

Favorable Test Results

As indicated on Line 9, the Rule 41 drop tests were eminently successful. We not only had a package that met with Rule 41, but we had one which was even better than its predecessor. To illustrate this we dropped the Shocksorb package through the Rule 41 sequence until we had a failure. The failure occurred on the 14th drop. We then dropped our "split

pack" until failure, and were pleasantly surprised to find the failure was not in our product; it was in the carton. At the end of 20 drops the plates were coming through the carton, but there was no failure of the product. We had our new package.

We were ready for step four in our program, the introduction of the new package. Elated with our success, for we knew this was the first major change in pie plate packaging in many years, we foresaw no trouble selling this package. The basic principles of our new "split pack" were sound and the savings were about 35 per cent.

Getting Acceptance

Now all we had to do was get the new package into production. The simplicity of that statement is very deceiving. No part of a high production organization can afford to adopt anything new without first making sure that the smooth functioning of the operation will not be disturbed. New ideas are being presented all the time, but each must be judged on the basis of how well it will fit into the existing whole organization, not just on how much it will reduce material costs.

Production says: "Sure, we want to reduce our packaging costs but not with an unproved package that may tie our production schedules in knots. Suppose we put up 50,000 of these new packages and then find something wrong? Who's going to pay the bill? Before you get our approval you'll have to prove your new package all the way through to the customer."

Warehousing says: "We tried to warehouse 125# cartons long ago and failed. What makes you think they will stand up any better now? If we did give an immediate approval to the new package, what would we do with the packing materials on hand? You will have to put your new package in the warehouse for two or three months, then send it to the customer for his approval."

And sales says: "Sure, we want a better package for our customers but we can't send them one that is untried. You will have to make warehousing and shipping tests, then give our customers a chance to express their opinion. Our customers will want to warehouse our product after it has spent some time in our warehouse followed by shipment to them."

On and on it goes, each department wanting to be sure the new package meets its own requirements. We could not find fault with the concern each felt for the success of his own operation, for theirs is a necessary attitude toward anything new and untried.

Selling The Idea

Actually, it took only two weeks to develop the "split pack', but it took about five months to get it into production. The hard work really began when we tried to sell our new package. Selling a new idea is usually more difficult than conceiving it. Unfortunately many objections to a new idea are often clouded by the emotional attitude of the objector. Consequently it is often difficult to separate the real objections from the excuses.

Meanwhile management was aggressively following our progress wanting the improved package to become an accomplished production fact. The sooner the new package could be in production, the sooner the 35 per cent reduction in material costs would become effective. Only the ideas *entering production* pay off. There is no better way to save money than to stop spending it.

We made arrangements for two full pallet loads to be warehoused under normal conditions for a period of two months before shipment to a selected list of customers. As in the introduction of anything new, we had problems. The packers were not trained in the "split pack" packing procedure; we had trouble with the automatic carton sealers sealing the 125# cartons; the materials handlers didn't load the pallets properly. What we needed was more "know-how" but that would only come with time and experience in the use of the new package.

We were not very proud of the quality of the package we sent to the warehouse. If our product stood up in that package it would be proof we didn't need a carton at all; only a paper bag and a light one at that. But, we completed the warehousing and shipping tests with these cartons in the hope they would perform well, thus making our brain child a glowing success.

Reviewing Of Results

In due time the trial packages were shipped to our customers. Some complained but most didn't. Of the complaints received most of them were not of breakage; only that the package looked very poor, was somewhat out of shape, and did not warehouse well. Finally, all the facts were in, and we had a round table discussion with all concerned. On the basis of this we came to the conclusion we could use the "split pack" but only with the 175# carton.

This was our final compromise. It had nothing to do with the ability of our package to carry our product. It was necessary to make this compromise to get a package that would be acceptable, not only to our people, but also to our customers. It was the kind of a compromise that has to be made from time to time to salvage the major part of a program that would otherwise be lost. In the solution of all problems we must recognize that what we do must fit into the general scheme of things; otherwise it will not be accepted, regardless of the value of the accomplishment.

Though we compromised our original package a number of times we ended up with one that reduced costs by 35 per cent, instead of our original goal of 44 per cent, and saved some of our intangibles in the bargain. We could be proud of our accomplishment for we had developed a new package where none appeared possible.

Scrutiny Goes On

Let us bask in the glory of our accomplishment while we can; for at some time in the future we or some other group will take another searching look at pie plate packaging and make another substantial reduction in costs of labor and/or materials. Nothing is static.

Our brain child is now an accepted fact. It came about through research and the application of sound engi-

(Continued on Page 40)

Thomas M. Glynn has been associated with John H. Breck, Inc. for 13 years. He has a B.S. degree in business administration from American International College. He is a member of Packaging Institute, American Management Association, and Institute of Management Sciences.

Contrary to the practice of many companies, John H. Breck, Inc. uses men rather than women as packaging line attendants. In this article, the company's production manager sets forth a thorough explanation of the reasons underlying this practice. His views offer much food for thought, and may suggest a similar approach to others.

Using men to operate packaging line machinery

By Thomas M. Glynn,
Production Manager,
John H. Breck, Inc.,
Springfield, Massachusetts

Opinions that are expressed in this article are those that have been formulated on the basis of experience acquired at John H. Breck, Inc., Springfield, Massachusetts. There has been no attempt made to survey the industry for all possible arguments on the question of whether it is better practice to employ male packaging line attendants or female attendants. We are following the practice which we have found to be best for our particular case. Other companies with other conditions are liable to do differently.

We purchased our packaging lines when equipment manufacturers were still filling the backlog built up during the war years and were offering 120 per minute as standard. In the past two or three years, packaging equipment capable of speeds of 200 per minute have become freely available and commonplace in our industry. Certainly when additional equipment is acquired, only the highest speeds available will be considered as well as those requiring the least number of operators. Equipment, however, is not the sole factor in optimum efficiency. A combination of capable operators and machinery is required.

A distinction must be pointed out at the beginning that what is being said here does not refer to line speeds, but to percentage of operational efficiency.

Early Use Of Men

The use of male packaging line attendants had its historical beginning eight or nine years ago when we installed our first automatic packaging line. Breck Hair Preparations had been in wide use for a number of years in the beauty shop professional field, and in 1945 the decision was made to enter into the retail consumer field with our line of hair preparations. Smaller sizes were added to our line. The next six or eight years showed a tremendous growth in the sales of our retail sizes caused by a rapidly expanding consumer market, and in our particular case, the developing and stocking of old line marketing outlets, which were the drug, department and syndicate stores. When this phase was completed, the growth of the grocery field as a toilet preparation outlet occupied our attention.

During this period our production was carried on in a small building in the center of downtown Springfield. Space limitations there reached critical proportions, and all our production was done on a single packaging line. We produced three sizes in ever increasing demand — with the result that short runs were the order of the day. Because of these pressures, change-overs had to be effected quickly and accurately. Time could not be wasted after a change-over in making adjustments. This situation would require a large number of mechanics to be on standby for change-overs while the machines were in operation.

We had to avoid at all costs the getting involved in hassles between mechanics and line operators for

Important reasons for having male packaging line attendants:

1. They immediately correct difficulties such as jams and stoppages.
2. A competitive spirit develops between the men on the lines.
3. They develop personal, possessive pride in the performance of their machines.
4. It is practicable to enhance their knowledge by letting them visit supplier plants.

poor line performance. The packaging line personnel many times was asked to work long and irregular hours. Due to all these conditions, the choice to use men as machine tenders became pretty obvious, and it proved to be a wise one.

In 1952, we purchased a much larger plant, and more packaging lines were added. This changed entirely the conditions under which we had previously been working. We now faced the problem of continuing our policy of male attendants or changing to female operators.

Keeping Up Production

In analyzing the problem, a very important point of view which we held was that the skill was in the machinery. The role that personnel played was to see that the equipment performed at its highest efficiency. Mechanical aptitude of attendants was vastly more important that dexterity.

We considered the line as a process, and the employees not as individuals but as a team. Our concern was to see that the line performed properly as a unit. This was the lesson we had learned the hard way from our previous experience during the trying years preceding our movement to the new plant.

With this thesis, the emphasis and importance of hourly rates of pay for machine attendants was nowhere near as great as performance. It was foolish to be concerned with 20-cent or 30-cent per hour wage differentials per operator at the sacrifice of production efficiency. We had to bear in mind the all-important part that unit production exercised over overhead costs. In the final analysis, all company expenses depend on goods being shipped and billed, and the more units produced, the lower the per unit overall cost.

With the criterion established, an analysis was made on the basis of inherent differences, economic advantages, and discipline and training.

Men Offer Advantages

Some of the inherent advantages of male preference over female were obvious. Turnover rate was lower, absenteeism less, less reaction to change of procedures, no restriction on length of hours or regularity. There were also some less obvious differences. While it is true that many women can make excellent machine tenders, we have always been careful in the selection procedure in hiring only that type of woman who seemed best suited to operations in the cosmetic industry. Because of this there was an extremely high percentage of our female employees who had no desire to get mixed up in the oil and grease involved in machinery attendant's work. Possibly for the same reason suggestions regarding improvements of performance were very unlikely to originate with women.

When packaging lines were down, there were fewer restrictions on the type of jobs that men could be transferred to, than those involving women. We could send men to the shipping room or warehouse, possibly even to do painting or maintenance work.

We looked to our operators to be alert to unfamiliar noises and actions and to report these. We felt that men would do this more satisfactorily.

Many times in our old plant, we held meetings with the men when a

Keeping a watchful eye on the movement of glassware, this attendant is alert to jams. His mechanical aptitude qualifies him to take immediate corrective action — without having to wait for a serviceman.

difficult production schedule was required, and we found that they more clearly understood, and were more receptive to, problems affecting the company's well-being. They always respond with their highest efforts. On the other hand, in similar circumstances, our experience with women seemed to indicate that they understood the problem more quickly than men — but the effect was usually short-lived.

From the economic viewpoint, anyone with a capital investment of from $50,000 to $100,000 in a packaging line would be foolish to take any chances with either the life of the machinery or the efficiency of its operation. Our management felt that in purchasing equipment, it was buying efficiency. When you consider that one of our packaging lines will process $40,000 worth of retail goods per day, the picture starts to come into focus.

Service Delays Are Costly

I have seen plants where elaborate lighting and buzzer systems were used to summon servicemen to clear jams and readjust machines to resume operations in case of breakdown. Without going any further, the problem that these companies have faced becomes obvious. The delay in getting a serviceman to a machine that is down obviously has proved expensive.

Each line, in addition to the female attendants, requires at least one and possibly two servicemen hovering around, to be available when trouble starts. The labor rate of these servicemen at approximately $2.00 per hour, when added to the rates of the four or five individual female machine attendants, offsets the additional 40-cent or 50-cent an hour individual male (compared to female) attendant's rates.

To this advantage must be added the elimination of lost time waiting for the mechanic to show up at the trouble spot. Our investigations disclosed that the national average for machine attendants (which is heavily weighted with female attendants) is about $1.50 per hour, whereas our male attendants' rates average $1.80 per hour.

"His Own" Machine

In the areas of discipline and training, we feel that when a man is given the responsibility of making the setups, lubricating the machine and operating it, there is little room left to shift the blame for poor performance. It is his machine and he soon finds himself ending up blaming himself when he attempts to shift responsibility for poor performance.

Experience has shown that minor adjustments during a run are a very important requirement for top performance. This is especially true after a small jam occurs which might throw out slightly some adjustments. If this condition is allowed to continue, the next jam will be of greater size and it will not be very long before the equipment is performing in a highly unsatisfactory fashion.

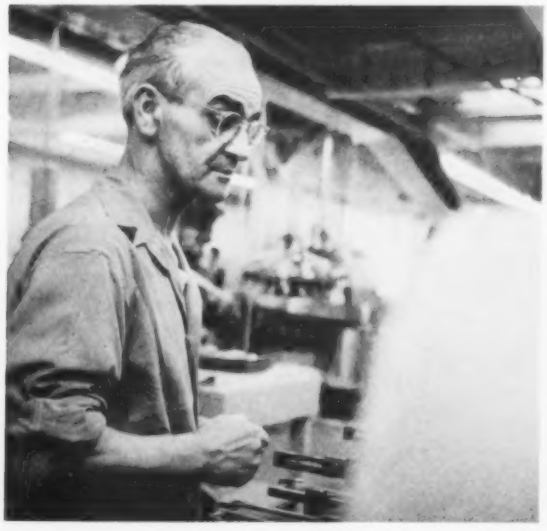
At change-over, more men are available and while the same number of man-hours is involved, the job does get completed much sooner.

Build Healthy Competition

It is possible to build up a more competitive spirit between packaging lines operated by men than it would be when operated by women. This is one of those intangibles which is very hard to assay, but it is a necessary ingredient to good performance. Like many good things, high proficiency breeds morale. This is true in business as well as sports. It is much better to have a 100 per minute line at 95 per cent than a 127 per minute line at 75 per cent, even though the net result is the same because in the long run, more will be

(Continued on Page 40)

A pride of possession develops in each man who has his own packaging machine. Along with this, he acquires a sense of responsibility, so that he is ever alert to keep his equipment functioning at top level.



The Breck organization thinks that the urgency of maintaining packaging line production is well worth the added cost of men (instead of women) as packaging line attendants. It pays off for this company.

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R. P. Kessler is a graduate of St. Vincent's College with a B.S. degree in chemistry. He joined Arkell and Smiths in 1947 after being placed on inactive duty by the U.S. Marine Corps. He was a fighter pilot and a captain. Prior to becoming director of packaging research, he was a packaging engineer. Mr. Kessler is a member of the technical committee of the Paper Shipping Sack Manufacturers' Association, the joint TAPPI-PSSMA test methods committee, both of Packaging Institute.

Here is an authoritative review of current developments in the field of multiwall bags. Mr. Kessler discusses some significant aspects of structural and functional features of these bags, and points up some outlines of future developments.

New strides in multiwall paper shipping sack industry

By R. P. Kessler,
Director, Packaging Research,
Arkell and Smiths,
Canajoharie, New York

The multiwall paper shipping sack is a one-way container, scientifically designed to handle a product from the packer to the user. The design takes into consideration the type of product packed, the method of packing and handling, shipping, warehousing and system of final distribution.

Inevitably, when multiwall paper shipping sacks are discussed, the problems of testing and specifications receive the greatest attention. There are two schools of thought on what constitutes the proper test for a multiwall bag. The first group advocates stiff specifications and tests for each of the component parts of the multiwall.

Here, each ply of paper making up the bag must meet rigid requirements for basis weight, tear, tensile, pH value, porosity, and stretch. Adhesives, closing materials, asphalt, waxes, etc., also must meet rigid specification requirements. The second group advocates a *performance* test for the completed bag, manufactured from component parts meeting definite standards. This group contends that once the bag is made, a performance standard is the only requirement to be met to prove the ability of the bag to handle the product.

Actually, both are related and, due to the wide variables that occur between the laboratory tests and the actual problems encountered, several technical groups are working to improve existing test methods and to develop new ones to predict the performance of shipping sacks to handle each product. With hundreds of products having different characteristics and different methods of handling and distribution, the task will not be easy.

New developments and improvements are results of technical research in the multiwall industry and, with the greatly-expanded facilities of the last few years, many of the developments are now available.

DEVELOPMENT IN PASTED TYPE MULTIWALL SHIPPING SACK

Stepped-End Bag — Valve Type

During the past year major producers of multiwall shipping sacks have shown keen interest in the acquisition of equipment required to manufacture the so-called stepped-end pasted multiwall bag.

From a visual inspection by the

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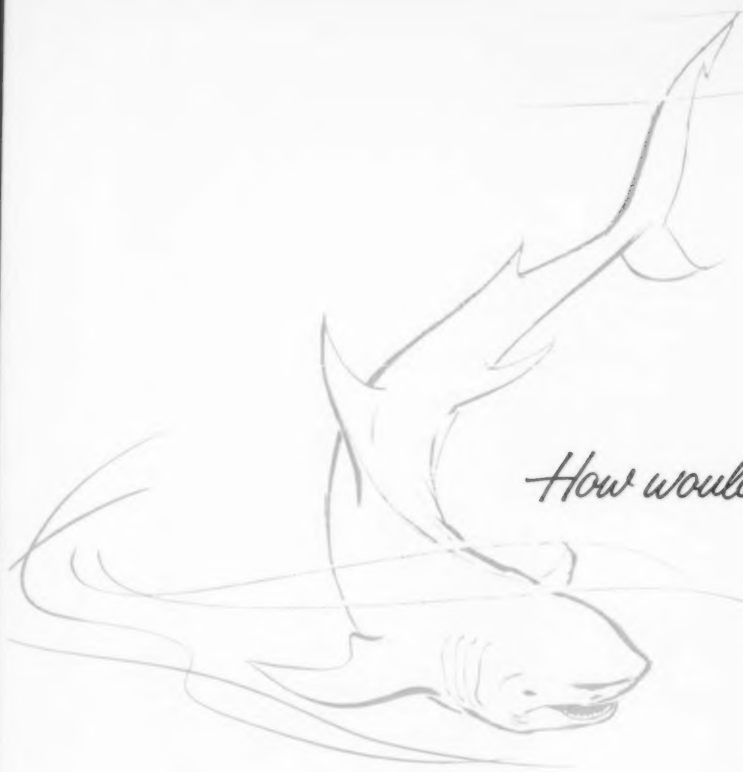

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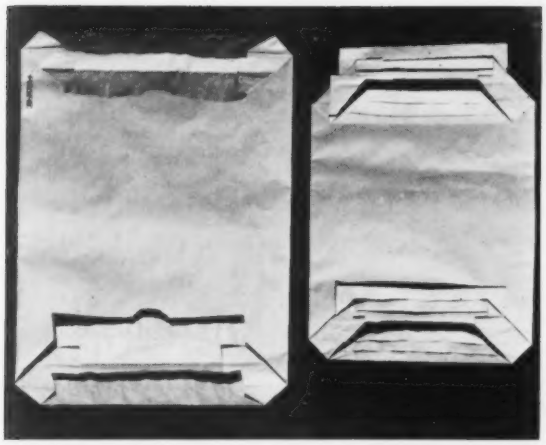
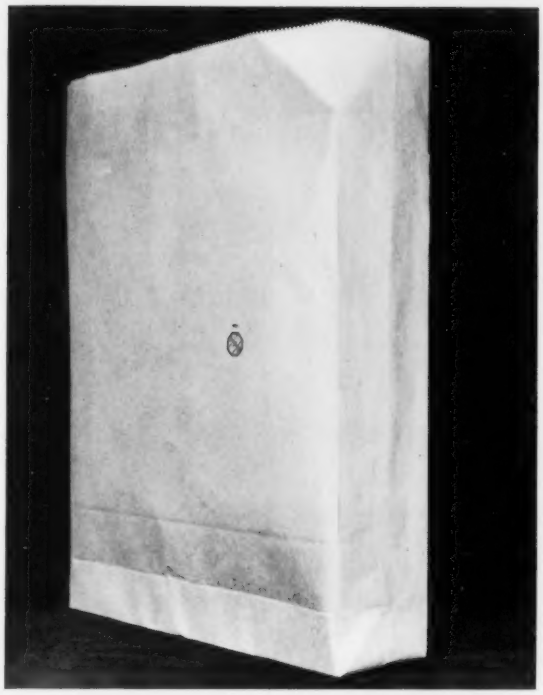


1. (Left) Regular pasted valve bag showing all plies held together with spot pasting. (Right) Stepped end pasted valve bag showing staggered cuts where each ply on one side of valve end or bottom end is folded and pasted to a corresponding ply on opposite side.



2. Flat tube pasted open mouth baler bag with edges scored to enable bag to open into a rectangular shape for inserting small filled packages.

user there will appear to be little difference between the present pasted bag he is now using and the stepped-end bag. (See Figure 1) Close inspection will reveal an immediate difference in the end or butt-formation of the two bags. In the present pasted bag the plies are locked together at the ends of the tube by adhesive applied in a series of spots. The locked plies are then folded over, and one application of adhesive holds the locked plies in place forming the valve and bottom. Thus, in a four-ply valve bag, there are eight thicknesses of paper in the ends of the bag.

In the stepped-end bag, each succeeding ply is cut back or stepped so that when the ends of the tube are folded and adhesive applied to form the valve end and bottom, each ply on the face of the tube is in theory pasted to its corresponding ply on the back of the tube. For this discussion we will refer to the face of the bag as being the side opposite the pasted longitudinal seams and the back as the seam side.

The most important features of this style of package from the user's viewpoint are:

1. Greater flexibility of the valve end.

2. More siftproof due to a different paste application.

3. Increased number of types of valve-closing devices such as special sleeves, extensions and inserts to provide better locking action.

4. Greater flexibility for using special moisture- and grease-barrier sheets not adaptable to present pasted valve shipping sacks in use.

The stepped-end pasted bag has been used with excellent results in Europe and, because of its greater flexibility, will undoubtedly achieve wide acceptance in this country. Various types and styles of valve-inserts and extensions can be provided to prevent sifting and spillage at the valve. It is also expected that a greater number of special sheets can be adapted to this bag that have not been available in the conventional pasted bag.

Scored Pasted Baler Bags — Non-Gusseted

One of the best improvements has been the development of the scored single or double-wall baler bag or Carton-Pak, shown in Figure 2. The score lines allow the baler to open in a rectangular shape increasing the efficiency of inserting small packets through automatic loading equipment, giving a more nearly square package for palletizing, and providing a neater all-around package than its unscored counterpart.

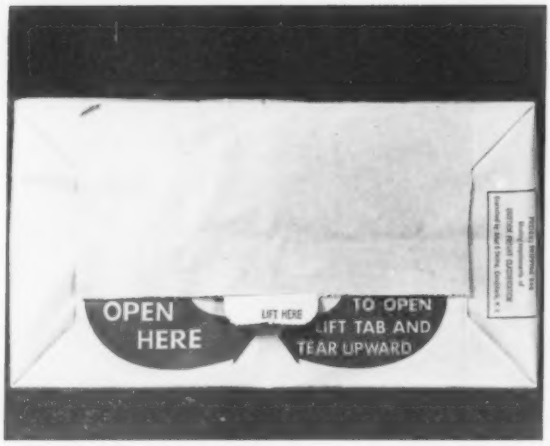
Quick-Opening Baler Bags

By eliminating a small strip of adhesive on the bottom of the bag, as shown in Figure 3, and by using a series of small perforations on each side of the thumb tab or tail, a means is provided for easy opening of the baler bag.

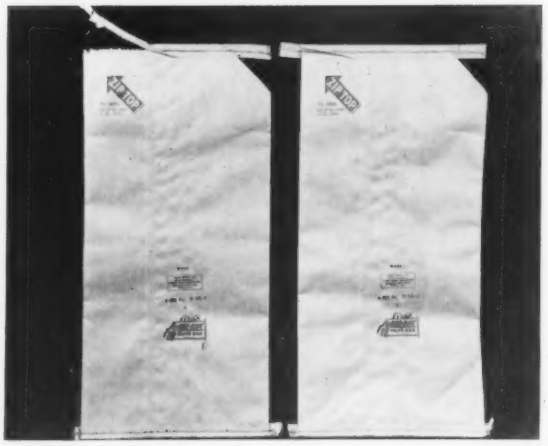
SEWN TYPE MULTIWALL SHIPPING SACKS

Tilted Valve

A recent development in the for-



3. The above photo shows the bottom of a filled multiwall baler bag incorporating a rip tab to facilitate opening. Area under tab is not glued, so bag plies will tear along perforations placed either side of tab.



4. In the above photo the bag on the right shows the small needle holes and notch that enables one to open a filled bag by grasping the extended tape and pulling up sharply. The notch starts the tear and follows the perforations to the stitching line continuing along the sewing line as shown in the photo at left.

mation of the standard sewn valve is the tilting of the valve opening to insure more positive closing action of the valve after filling. Examination of the valve will show that the distance from the sewing line to the bottom of the valve opening is deeper along the outside edge of the bag than it is at the point where the material enters the bag.

In use, this formation has made easier the placing of the bag on the filling spout of valve-bag packers, and its closure action has reduced the amount of spillage or sifting from the valve-opening after the filled bag has been removed from the packer.

Easy-Opening Sewn Valve Or Sewn Open-Mouth Multiwalls For Feed and Fertilizer

A series of small perforations are placed close to the sewing line to facilitate the opening of filled sewn bags, as shown in Figure 4. This is being used in the feed and fertilizer industries to help the farmer open the filled bags quickly and cleanly for emptying into feeding trays and hoppers. Wide experiments with the feature are being carried out and indications point to wider use as results are obtained from field tests.

Reinforced Gussets or Structural Strip

Shipping tests and experimental handling are being carried out on five and six-ply sewn open-mouth and sewn valve bags wherein a ply is removed from the bag and replaced by a strip of kraft paper in each gusset. (See Figure 5) The intended purpose is to maintain strength at the weakest point in the gusset area while affording a saving to the user by reducing the amount of paper necessary in the bag itself.

Where a user of multiwall bags is experiencing high failures in the gussets it would be logical to test bags reinforced in this manner. However, if most failures occur at the sewn ends, the most logical remedy would be reinforcement at this point either by increased basis weight, an additional ply, or a variation of the end closures used.

Welded Seams

Multiwall bags constructed with polyethylene coated, polyethylene-wax coated, special clay-coated release sheets, and other sheets of this type, as shown in Figure 6, are now being produced with heat sealed seams or seamed with special thermoplastic adhesives replacing the latex-type adhesives generally used for this purpose. The general efficiency of the package is greatly increased, providing a much tighter bond with greater resistance to damage by the product packaged.

What new items will be coming from the expanded research facilities of the industry one can only surmise. Much work is being done on special coated papers to be used as liners in multiwall paper shipping sacks, wherein tacky or adhering products are packed, to prevent these products from sticking to the walls of the bags and rendering the product unusable.

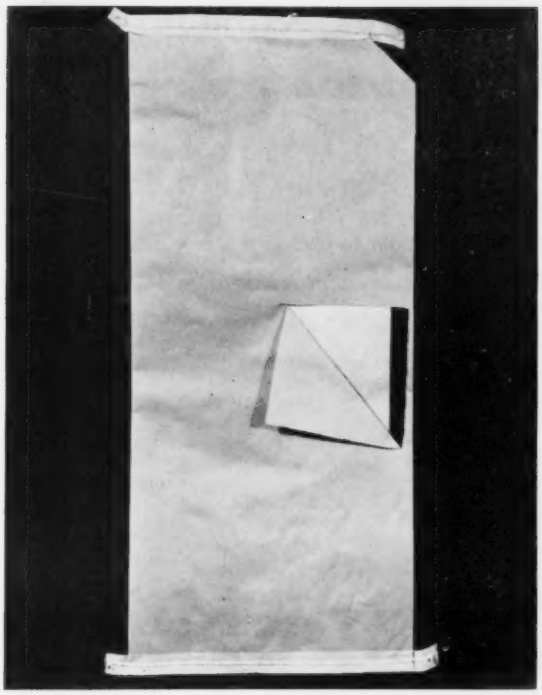
One of these new sheets uses a clay coating base with an overcoat of polyethylene or other type plastic resin. Silicone-treated glassine and parchment are also being tested as release-type liners.

New projects for treatment of shipping-sack kraft to prevent insect infestation are being undertaken with further work being done on the use of pyrenone and lindane for this purpose.

Grease resistant or barrier sheets and treatments are presently being tested in many manufacturing plants, and some of these may produce a good, low-cost barrier having greater structural strength than the individual sheets of glassine and parchment now in use. The combination showing the greatest promise is glassine wax-laminated to natural kraft. Parchment and greaseproof, laminated to natural kraft for increased strength, are also being tested.

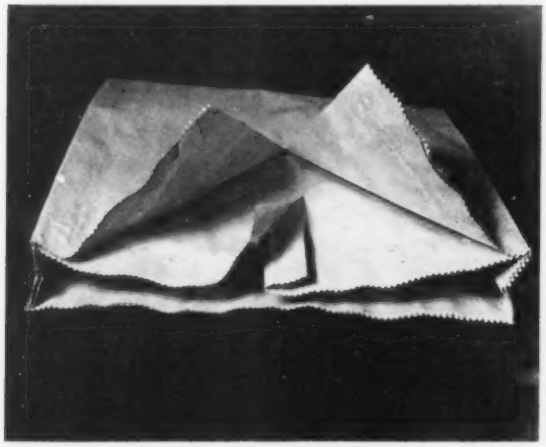
Several treatments such as Minnesota Mining's Scotch-Gard for kraft paper are being widely tested and show good results. Du Pont's Quilon treatment for parchment and glassine prevents grease crawl, one of the major headaches when packaging products having a high grease content.

It is reasonable to expect that a future round-up of new developments will find many of the above items presently in the development stage an accomplished fact.

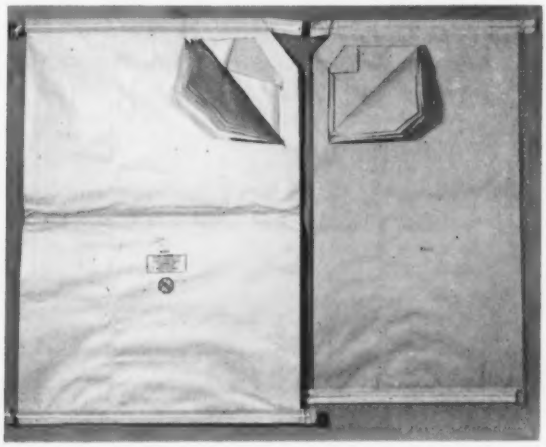


5. Cut away section of a multiwall showing placement of structural strip (shaded). Strip is placed in both gussets and extends from sewing line to sewing line.

6. In the photo below the outer plies of a multiwall bag are cut and folded back to show how the polyethylene coated liner is folded and sealed, polyethylene to polyethylene. In this formation, kraft paper does not come in contact with the product.



7. Sewn valve bag on left shows the tilted valve feature. Sewn valve bag on right is a regular style valve extension. Tilting of valve extension allows for easier placement on packer spout and makes a more positive closure.



Packaging shortcut reveals way to capitalize on inadequate space

Having no room to install a take-away conveyor usually thought necessary to a frankfurter packaging operation, Jos. McSweeney & Sons, Inc. not only found a way to get along without it, but also the company made a simple change in its pre-cartoning transfer—resulting in a saving of 93 cents a hundred pounds. Its experience proves that it does not take elaborate equipment or methods to come up with effective production line improvements.

By making a simple change in its method of receiving and piling frankfurters prior to cartoning, Jos. McSweeney & Sons, Inc., Richmond, Virginia, meat packer, now gets substantial savings in its production and packaging line costs. This company is saving 93 cents per hundred pounds, with its current machine operation—as compared to its former hand operation.

Focal point of the innovation is the method of handling skinless frankfurters following the skinning or peeling operation. Severe space limitations in the room where this operation takes place prevented the installation of the relatively long conveyor that is usually a part of such an operation. Therefore, the McSweeney organization found a way to do the job—and got a saving while doing it.

What happens is that the skinless frankfurters go into a temporary casing which has to be removed following the processing operation. This is done on a standard Linker machine. Supplies of frankfurters awaiting skinning are brought into the packaging room on a truck. A girl feeds these strings into the machine, which discharges the individual, skinned frankfurters via a short conveyor.

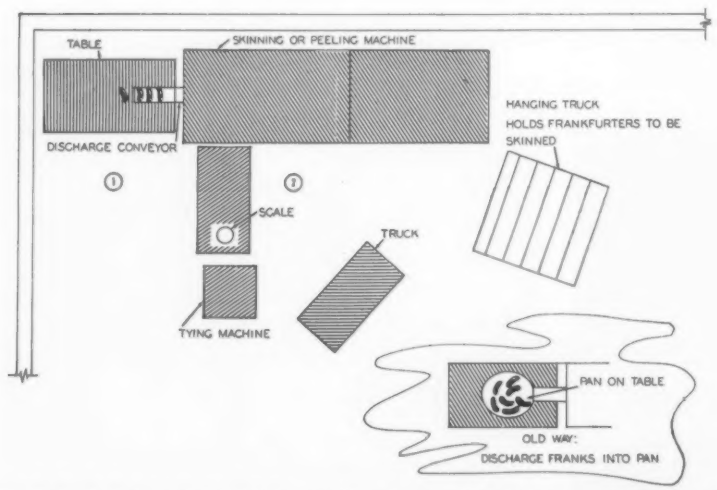
As the skinned frankfurters move down this conveyor they are in rows, like logs rolling down a runway. The first four or five discharge in this parallel fashion; after that, the succeeding frankfurters tend to scramble. Therefore, the secret of an efficient cartoning operation is for the packer to catch them *before* they start to scramble.

The whole job is a two-girl operation. One girl places strings in the machine, then weighs and ties individual cartons of frankfurters, and places them on a truck for transfer to a shipping cooler. Occasionally, she has to hand-skin frankfurters that the machine rejects. Meanwhile, a second girl takes the production emerging from the machine and places these frankfurters in folding cartons, typically a six-pound carton.

When she completes the filling of a carton, she places it on an adjoining table, so that the other girl may weigh it and tie it. To have an efficient operation the girl packing the cartons has to keep up with the machine. She must pick up the frankfurters while they remain aligned on the discharge conveyor. In the course of her regular job she puts a band around one frankfurter in each layer, in each carton.

The old way, prior to installing a machine, was to skin by hand, then load the cartons. Two girls doing this turned out 150 pounds an hour. Further, a stock boy had to tie the cartons in many instances. This operation, for the two girls (hand skinning) cost $2.00 per hundred pounds. The first major improvement in this operation came with the installation and use of a machine for skinning.

Initially, the skinned frankfurters discharged from the machine, came down the conveyor and dropped into a pan. They became well scrambled



This is the technique that is attaining notable savings for the McSweeney organization. Focal point is the advantage of catching frankfurters *before* they scramble. Note also the positioning of equipment — all geared to peak working efficiency.

in this pan. As a result, the girl loading cartons had to spend a lot of time aligning or straightening the frankfurters. This operation, with two girls and the machine, cost $1.50 per hundred pounds, and the two girls turned out 200 pounds an hour. Even so, a stock boy had to do the bulk of the tying work.

From all this came the present operation. Its success depends on the girl catching the frankfurters before they start to scramble: She picks them from the discharge conveyor of the skinning machine and transfers them to a catrton. With this method, production of the two girls amounts to 280 pounds an hour. Cost of this is $1.07 per hundred pounds, thus giving a saving of 93 cents a hundred pounds, as compared to the hand operation.

Robert McSweeney, vice president of the company, pointed out that these figures do not include any charge for depreciation, maintenance and electricity. However, they do include the cost of fringe benefits as well as actual wage payments to workers, he observed, noting also the frankfurters used in this operation are the twelve-to-a-pound size.

Under the present method, 140 pounds per girl per hour seems to be about the limit of production, according to Mr. McSweeney. He said that if they seek to step up this operation to 300 pounds or more per hour on a consistent basis, it is necessary to add a third girl to the line.

One of the major problems involved in developing the entire operation was the planning of the layout, due to the small size of the area available for it. Since there was no space for a take-away conveyor from the machine, the company devised the present method. Its layout represents a lot of trial-and-error of equipment placement.

Illustrating the importance of attention to small details is the positioning of the truck for the loading of filled cartons of frankfurters. Both its location and the particular angle of placement are conducive to the saving of steps and motion—all contributing to the present effectiveness of the job.

Collected papers of six years of SIPMHE programs

A rare opportunity to build a packaging reference library has come about through the efforts of the Society of Industrial Packaging and Materials Handling Engineers. It has collected and is offering as a package the papers presented at its "short courses" from 1950 through 1955.

In the aggregate, these papers comprise an amazing variety of educational material pertinent to packaging. They range from abstract technical papers provided by well-known teachers of engineering to highly practical discussions of day-to-day problems by men who are on the firing line. In addition, the technical specialists of numerous packaging materials suppliers present the developments and thinking of their particular areas.

A Reference Tool

Obviously, some papers are largely of historical interest, such as those concerned with meeting the special problems arising from the Korean situation. The real value of all this material, however, seems to lie in its availability for ready reference. Each of the six books carries an index listing the titles of papers as well as their authors.

Thus, a packaging engineer seeking information on a particular topic can in a matter of minutes fan through the indices to see who has discussed the subject. Possibly, a cumulative index to the whole series would be helpful, but its absence is not serious because of the relative ease of checking the index in each book.

Many of the papers carry illustrations, facsimile reproductions of charts and forms, and similar specimen material. In some cases the questions and answers following the papers are recorded verbatim. Since each of the books carries the papers and work of 30 to 50 people, the cumulative effect is that the ideas of several hundred specialists are compactly collected in a set of books that may be held in one hand.

Easy To Use

Three of the books are five and half by eight and a half inches, with stitched binding, carrying over 200 pages each. The other three are the loose-leaf binder type, carrying the papers on eight and half by eleven inch paper. All of them utilize typewriter type, hence capitalize on the underlining, spacing, subheading and indentation methods which typewriter usage permits.

Those who go to SIPMHE meetings year after year find that their interest in particular sessions varies—depending on the emphasis which the program gave to their particular fields or specialties. Thus, the advantage of having six years of such programs within reach is apparent: When searching for information on a particular topic, one can go through all the volumes, focusing on the particular coverage sought—as found in each.

The list of speakers who have presented papers reads like a who's who directory of packaging suppliers and users alike, as well as those engaged materials handling and related fields. In view of the care exercised by program committees in selecting the best available talent each year, the end result is that these six volumes represent an outstanding collection of the specialized thinking of acknowledged experts in the field.

This literature is available in complete sets (1950 through 1955) at $12.50 a set, according to SIPMHE's national headquarters, who reports also that the individual items comprising each set are available separately—details upon request. Orders for sets should be addressed to:

Society of Industrial Packaging
and Materials Handling Engineers,
111 West Jackson Boulevard,
Chicago 4, Illinois

Use of work sampling techniques as an aid to the job of determining packaging costs: This is a focal point of the approach used by Link Aviation, Incorporated. In this article, Mr. Christianson reviews a number of practical aspects of finding these costs—including suggestions concerning just how to start such a project.

Determining packaging costs for spare parts

By Jack V. Christianson,
Industrial Engineer,
Link Aviation, Incorporated,
Binghamton, New York

Jack V. Christianson has been with Link Aviation since mid-1955. Previously, he was packaging engineer of General Precision Laboratory, an affiliate (as is Link Aviation) of General Precision Equipment Corporation. Prior to joining this organization he was with General Electric Company 14 years, having joined it as an apprentice machinist after completing high school. His service with GE included work as packaging planner, foreman and field engineer.

Individual packaging cost of over 8,000 different spare parts, determined by the expenditure of industrial engineering time averaging .007 hours per part — that is what was done recently at Link Aviation, and done with sufficient accuracy to completely satisfy government auditors.

When it became apparent that packaging cost of spare parts should be accurately determined, a review of cost determination methods was made by the industrial engineering department.

Time study seemed out of the question because of the shortness of runs, long time lapses between repeat runs and the continued additions of new parts to be packaged. An operator's ringing of the clock on each packaging operation for each part was considered to be of no better value than time study, and would reduce productivity. About this time someone suggested we should "punt" — and that seemed quite reasonable.

One of the diehards came up with a reprint of a July, 1952, Factory Management and Maintenance article entitled "Work Sampling". Using the work sampling method would provide us with a means of determining the number of observations required for any degree of accuracy considered adequate. Work sampling immediately appealed to the suppressed gaming side of several people involved, and we decided to ascertain if this method could be applied to our costing dilemma. We decided that it could because we had the necessary elements available.

1. A record was available of the material used to package every part.

2. Total quantities packaged each day were known.

We Sought Standardization

Several months before the survey was started, we had decided it was necessary to obtain a higher degree of standardization in our packaging. When each operator was completely packaging all parts assigned to him, standardization was non-existent. Very few parts were under-packed but we certainly shipped a lot of extra dunnage. Standardization was accomplished by making one operator responsible for establishing the sizes and material used in all packages.

This operator, to whom we gave the title of pilot packer, received a copy of Packaging Information Form, ANA Bulletin 302-a, (PT card) (See Figures 1 and 1a), with each order. This described the basic unit package as to nomenclature of part, quantity per package, compound (type of preservative oil, if any), container, dunnage and wrap. With this basic information, it became his job to package the initial part in the most economical manner and record the materials used on the back of the PT card.

What Survey Needs

The fact that we had the packaging material recorded gave us confidence to start the survey. Anyone desiring to conduct a similar survey does not need to have this backlog of information. If you establish a pilot pack operation today, you can start your study as soon as each operator is following his instructions. This period would probably be less than a week.

Total hours worked in the packaging and packing areas were easily ascertained as was the material used to package each part. To establish the packaging cost for any and all parts, we needed to get labor and material together in the proportions used for each part.

At this point, it should be understood that material costs were determined only for those parts which were recorded as being observed.

Now we had to devise a form on which we could record the drawing numbers of the parts being worked on when we made our observations. Figure 2 illustrates all of the headings necessary to compile operations data. We decided we would go beyond that and record individual operators' delay time and the various functions performed. We expected that such information would aid us in deciding what operations should be considered for improvement and if avoidable delays could be minimized. (See Figure 3 on Page 26)

Data Gathering

At random times throughout the day, observations were made and recorded on the form shown in Figure 3. The recording of information consisted of noting the drawing number and quantity of the part being worked on by the individual operators. Two industrial engineers gathered the data, worked independently of each other in regard to when

1. STOCK NUMBER AF / NAVY / SIGNAL: 6930-300-1861				2. AF CODE: 6930	3. NOMENCLATURE: Servo Assembly			
4. PART NUMBER: 260247				5. AF CLASS: 69	6. CHARACTERISTICS: Fragile		7. MATERIAL AND FINISH: Various	
8. NET WEIGHT (LBS.): 36.25		9. NET CUBE (FT.): 1.4			10. DIMENSIONS: 19"x19"x8		11. T.O. OR SPECIFICATIONS	
	12. QTY.	13. COMPOUND	14. METHOD	15. CONTAINER	16. DUNNAGE WRAP	17. DIMENSIONS	18. GROSS CUBE	19. GROSS WT.
UNIT PACKAGE	1	0	II B	DC/EHV/DC	A/K	26"x17"x10"	2.5	50
	20. QTY.	21. DWG. OR SPEC.		22. CONTAINER	23. TAPE	24. DIMENSIONS	25. GROSS CUBE	26. GROSS WT.
INTERMEDIATE PACKAGE								
	27. QTY.	28. DWG. OR SPEC.		29. CONTAINER	30. CASE LINER	31. DIMENSIONS	32. GROSS CUBE	33. GROSS WT.
SHIPPING CONTAINER	COM.							
34. ASSEMBLY				35. TYPE LOAD		36. ANA CARD LIST NUMBER		37. CARD NO. 7922
38. NOTES								
39. PART NUMBER: 260247			40. CONTRACTOR: LINK AVIATION			41. CONTRACTOR'S FILE NUMBER		42. DATE: 2-56

Figure 1

Here is the front of a PT card on which appears the basic data concerning the packaging of a particular unit.

F 1273

DWG. NO. 260247	NOMENCLATURE Servo Assembly	PT. NO. 7922
CLEANING 0	OIL OR GREASE 0	
METHOD OF UNIT PACKAGE II B 1 pc. unit pack.		
INITIAL WRAP A 1 pc. 44"x36"		
DUNNAGE K 1 pc. 45"x32"	OVERWRAP 0	
CARTON 101691		
DESICCANT 50 units (3-16 unit bags, 1-2 unit bag		
BAG 102400		
CARTON 101692		
SPECIAL BLOCKING, BRACING OR CONTAINER		
REMARKS		

Figure 1a

Reverse side of this same PT card reveals more of the details regarding the preparation and packaging.

DRAWING NO.	QUANTITY	CATEGORY

Figure 2

Headings used on a form which Mr Christianson and his associates devised to record drawing numbers and other data, at the time of making observations. Note the simplicity of this working form.

11/19 DATE

NAME	STATION 1 PILOT PKG.	STATION 2 LABEL	STATION 2 WRAP	STATION 3 INSERT	STATION 3 SEAL	STATION 4 LOAD CTN.	STATION 5 SHIP	DELAY AVOID	DELAY UNAVOID
A. HELLER	(5)	66348 (1) (5) 96346 (5) 96348	(1)						
J. BASCOMB				(2) 43766 (6) (3) 96349 (2) 96600 (3)					
P. DOWD						(2) 48038 (1) (2) 48043 (3)			
S. ROWE							(4) 59573 (3) (2) 96110 (1) (1) 49276 (1)	(3)	
J. FITZPAT	(1) 59411 (3) (2) 59601 (4) (3+) 59813 (2)								

( ) QUANTITY AT STATION

O PRICE CATEGORY OF PART

Figure 3

Going beyond the data recorded on the form in Figure 2, this record shows the operators' delay time and the various functions performed. Industrial engineers worked independently of each other in gathering this material.

they entered the packaging area. Other than establishing a goal for the total number of observations to be taken per day, no coordination as to when each engineer would record data was established. Occasionally, both men would be in the packaging area at the same time. Admittedly, data recording restricted the activities of the engineers. However, they were able to carry on their other assignments to a considerable degree.

The packaging personnel and supervisors concerned were briefed as to the objectives of the study. The object of the survey was to obtain the true cost of packaging. They were told that we would record their delay time with the objective of incorporating new methods, procedures or equipment as was indicated by the cause of their delay.

They were asked to operate insofar as possible with the methods and procedures to which they were accustomed and to ignore us if possible. The following is submitted as an interesting sidelight to those who are interested in the psychological aspects of outsiders being in close contact with a manufacturing operation for an extended period of time:

The initial attitude of the operators was one of suspicion in spite of the fact that they had been told there would be no criticism of their actions.

How Attitudes Changed

It appeared that the operators actually slowed down. It seemed to us that they were challenging our statements of no criticism. After about three days of non-committedly recording operations and delay time as they were observed, the attitude changed to one of wholehearted cooperation. Suggestions, both good and of little value were offered by the operators, as to how the work could be done more easily and more quickly.

We had to remind them that we wanted the survey to reflect the operating conditions as they existed and that we would evaluate any ideas at a later date. The cooperation was so good that the personnel delay time was reduced to half of what we normally expect throughout the rest of the plant. Productivity effort was materially increased.

After the survey, casual observations indicated that both personnel delay time and productivity effort reverted to plant standards. Allowances for these factors were made in the final cost analysis.

Review Of Results

Let's take a look at our accomplishments regarding data up to this point. For each day's operation, we had recorded the parts and quantity which were being worked on when observations were made. From the PT cards for these parts, we can determine the cost of materials used to package each part. By submitting the drawing numbers to the cost department, the selling prices can be determined. The customer had requested that the cost of packaging be determined by selling prices broken down into various categories:

Category	*Selling price*
1	$ .01 to $ .50
2	.51 to 1.00
3	1.01 to 2.00
4	2.01 to 5.00
5	5.01 to 10.00
6	10.01 to 20.00
7	Over $20.00

Selling prices of an individual part vary with the quantities purchased. This fact is the only reason for recording the quantities of each part observed. Another factor we know is the total number of hours expended for packaging and packing each day.

What we do not know is:

1. How many parts and in what price categories were those parts packaged during the entire day.
2. What shipping containers were used.
3. What dunnage was used.

Establishing Figures

Naturally, the shipping department knows what they have to ship. We learned that this information was recorded on orders going through the shipping department. The information was transferred to shipping documents and the orders discarded. We salvaged the discarded orders. The cost department categorized the parts shipped, by selling price, thereby supplying the information as to each day's production.

These same orders were used by the shipping department to record the identification and quantities of shipping containers used. The cost department converted these into dollars. There are material costs, in addition to the shipping containers, in excess of those materials recorded on the PT cards. There are costs incurred for strapping, dunnage, ink, tape, etc. These costs were considered too nebulous to pinpoint. We decided on a constant figure for each shipping container, and factored in that constant.

By adding all of the observations recorded, according to categories, we can establish a percentage of the day's output for each category. If category 3 consumed ten per cent of the day's time (according to our observation) and 80 hours were expended packaging, then eight hours were expended on category 3. If 800 parts of category 3 were packaged during that day, then .01 hour was the time required to package each part.

How It Works

Example of Computation:

80 hours expended in department.

200 observations made.

20 observations were in category 3 (ten per cent of observations).

Ten per cent of 80 hours = eight hours expended on category 3.

Total of 800 parts of category 3 packed.

Eight hours ÷ 800 pcs = .01 hour expended for each category 3 part.

The unit cost of the packaging material for the parts observed can now be compiled by categories.

At this point, you have determined labor and material cost for each category. Burden and any other factors required can be added to determine total cost.

The procedure outlined above is based on the fact that enough observations have been taken to establish a degree of accuracy satisfactory to all concerned.

Sampling is based on the laws of chance. If you flip a coin *enough* times, you will come very close to getting heads 50 per cent of the time.

Factory Management and Maintenance, in its article "Work Sampling", has established a formula for determining what constitutes "enough times". The formula is set forth with a chart derived from it.

$$N = \frac{4\,(1\text{-}P)}{Y^2P} \qquad N = \frac{(1\text{-}P)}{Y^2P}$$

N = Total number of random observations.

P = Percentage occurrence of the element being sought, expressed as a decimal (i.e., write ten per cent as 0.10).

Y = Element tolerance.

Percentage occurrence	One per cent element tolerance	Five per cent element tolerance	Ten per cent element tolerance
1	3,960,000	158,400	39,600
5	760,000	30,400	7,600
10	360,000	14,400	3,600
20	160,000	6,400	1,600
30	92,000	3,680	920
40	60,000	2,400	600
50	40,000	1,600	400

Tabulation of No. of Observations, Quantities and No. of Hours

CATEGORY	DATES-	11/10	11/11		11/21	Totals	Average Hrs. per piece
1	Observations	36	44		15	515	
.01-.50	Total Qtys. Packed	101	290		2203	23,527	.018
2	Observations	11	17		5	221	
.51-1.00	Total Qtys. Packed	0	127		230	10,248	.021
3	Observations	5	13		7	239	
1.01-2.00	Total Qtys. Packed	5	293		851	4,041	.034
4	Observations	16	17		7	314	
2.01-5.00	Total Qtys. Packed	29	100		496	3,728	.031
5	Observations	19	9		2	250	
5.00-10.00	Total Qtys. Packed	14	253		93	3,635	.058
6	Observations	17	8		3	46.1	
10.01-20.00	Total Qtys. Packed	8	454		368	4323	090
20.01-up	Observations	72	39		40	505	
	Total Qtys. Packed	27	303		421	3,437	.199
Total No. of Observations		176	147		79	2,305	
Packaging Hours		90.5	79.8		96.0	1892	
Shipping Hours (Distributed to all Cats.)		32c	26.9		20.6	507	

NOTE: The quantities designated by the Date, under heading of Total Qtys. Packed do not necessarily reflect the quantity packaged and packed on that date. Quantity is of importance only insofar as totals are concerned. For ease of tabulation the quantities are denoted on a daily basis since the shipping orders are collected daily.

Figure 4

This form records all of the data on the parts being packaged, with the information recorded at random times over a period of several weeks.

How Many Observations?

By determining the degree of accuracy (element tolerance) which you consider adequate, you can determine the number of observations which you must make. You must make a decision as to what percentage of the total time is consumed by the particular element you desire to measure. This does not have to be accurate because your data will establish this as you progress in your study.

Your decision merely puts you in the right ballpark. Because we had several elements (seven categories) for which we wanted to establish costs, it was necessary to obtain the degree of accuracy desired for the category occurring the least number of times. All other categories will automatically have a higher degree of accuracy.

As an example: During our study, we guessed incorrectly on both the category and the percentage of occurrence. Until we took enough observations to establish a trend, both the category and percentage of occurrences fluctuated. This is to be expected. Let's go back to the coin flipping routine. If you flip the coin ten times, you may get eight heads and two tails. Try another ten times and you may get six tails and four heads.

If you try again, four tails and six heads could be the result. A small individual series of coin tossings is quite apt not to give you a 50-50 ratio. The law of chance however says that if the coin is flipped for several hundred times, the overall ratio of heads to tails will be very close to 1 to 1.

When you decide on the degree of accuracy which you will accept, you simply start taking observations until the percentage of occurrence stabilizes. After approximately two weeks, our study indicated which one of the seven categories occurred the least times. This category, during the continuation of the survey, occasionally climbed to next to the lowest percentage of occurrences but fell back as the number of observations increased.

As a practical matter, we adopted the following routine to arrive at the cost of packaging and packing small parts.

Data Preparation

1. Recorded all of the parts being packaged at random times throughout a period of several weeks (see Figure 4).
2. Recorded the number of manhours expended by packaging and packing personnel.
3. Operators who were packing bulk quantities of several parts in shipping containers were considered to be part of the cost which must be recorded separately.
4. Total quantity of parts packaged and packed were recorded.
5. Parts observed were categorized as to price.
6. Recorded packaging materials required to package each part observed.
7. Recorded quantity of shipping containers used during the survey.
8. Weekly determination, by percentage, of total observations of each category so that the total number of observations required could be determined.

Costing By Category

1. Determined the average cost of materials to package individual parts.
2. Determined labor cost to package individual parts.
3. Determined the total cost of shipping containers. (Allocate to categories according to percentage packed.)
4. Add the cost of materials, labor and burden for each category.

Work Sampling is a boon to the hard-pressed production control manager or industrial engineer in the determination of delay time. Once the principles are understood through actually working out a problem, more and more applications become apparent.

Recently a survey was conducted on a group of inspectors to ascertain what percentage of their time was actually spent inspecting as opposed to obtaining blueprints, counting, exchanging parts, cleaning parts, making minor repairs, etc.

A degree of accuracy for the survey of 20 per cent (± ten per cent element tolerance) was considered satisfactory. The actual delay time was 50 per cent. The formula set forth earlier required 100 observations to tell the story. There were six inspectors involved in the group. Observing the group eight times a day for two days was enough. The suspected high rate of delay time was corroborated. An additional inspector was added to the group whose job it became to service the other inspectors in regard to information gathering, repair work and any lesson required, thereby increasing the productivity of the individuals.

Mr. Christianson notes that William Koban, also an industrial engineer associated with Link Aviation, furnished valuable assistance in taking readings during the survey and in evaluating the principles of work sampling as applied to this particular project. Mr. Koban, a graduate of Union College, had several years' experience with General Electric in motion time study work prior to joining Link as an industrial engineer.

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Bartelt's "Panel of Experts" will be at the PMMI Show to Help You!

If your product can be contained in a pouch style, heat sealed bag, bring your packaging problems and a sample of your product to Booth 103 at the PMMI show for study. Bartelt's Panel of Experts will (1) Analyze your product and problems, (2) Present packaging ideas, (3) Prepare sample packages, (4) Give you a firm, written quotation. All of this without obligation on your part, but with the hope that our experts can show you how a versatile, automatic Bartelt Packaging Line can save you money, and give you a sturdy, sales-winning package. A Bartelt Line will make, fill, and seal pouches, and insert one, two, or three pouches into a carton. You will find that your packaging problems will get sincere study by experts in Booth 103.

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SEPTEMBER 11-19

BOOTH 103

CLEVELAND AUDITORIUM

Here is the latest word on the first four-year course in packaging technology: In spite of having made landmark progress, those guiding the course feel that they have but scratched the surface of its opportunities. All this will take plenty of support—financially and otherwise, but it offers a blueprint for the development of tomorrow's packaging experts.

Michigan State packaging course makes notable strides

A growth in students from just a few to 103, the accumulation of equipment worth some $44,000, and the furnishing of additional teaching time — these accomplishments highlight Michigan State University's report to its industry advisory committee on packaging technology. Members present for the fourth annual meeting of this committee not only learned of the university's plans for expanding the packaging program, but also launched a program of their own.

To participate with the university officials in guiding the expansion effort the industry advisory group authorized the naming of a smaller body, an executive committee to be chosen from the members of the advisory committee itself. R. Bruce Holmgren, editor, Package Engineering, whom the advisory committee named as its chairman, will be chairman of the executive committee.

Need Working Group

Underlying this move is the need for large scale expansion of the entire packaging program. A major reason for the need of a small "operating" committee is to have a working group that can conveniently and with some frequency sit down with the university officials as the work progresses.

Large Sums Needed

Committee members and university people alike agreed that several hundred thousand dollars worth of facilities and manpower will be necessary if the program is to meet the needs of the future. The industry advisory group virtually mandated its forthcoming executive committee to aid the university in working out suitable means of presenting the proposed program to all who would be able to provide financial support, and who would be the beneficiaries of the results of the enlarged program. Committee members also indicated their willingness to assist those responsible for conducting the packaging courses in winning enhanced support from the "top management" of the university.

As it does every year, the advisory group reviewed the curriculum course by course. Consensus of the group was that the current course content represents probably the best possible use of the available course hours.

Reviewing results of the program, James W. Goff, who teaches most of the packaging courses, said that during the past school year 16 students received degrees in packaging technology. Demand for these graduates was indicated by the fact that there were at least 80 specific offerings, Mr. Goff noted. Seven of these graduates have been placed with suppliers of packaging materials as sales representatives, technical service representatives or product development engineers. Seven others have been placed with user companies in either package development or purchasing capacities. The other two graduates are now completing their military service obligations.

Acquire Lab Equipment

Many of the pressing needs for laboratory equipment have been alleviated. The university's department of forest products budgeted $7030; the college of agriculture, $10,000, and industrial donors provided either

cash or specific equipment amounting to $27,475.

The university has allotted an additional full time staff member to the program. This action brought Dr. H. J. Raphael into the work of teaching the packaging courses, assisting Mr. Goff — who has carried the bulk of the load to date.

Among Those Present

Committee members present at the recent annual meeting included R. Bruce Holmgren, editor, Package Engineering, chairman; W. B. Bronander, Jr., Scandia Manufacturing Company; Don Brownell, vice president, sales, KVP Company; Harrison L. Goodspeed, Jr., packaging engineer, American Box Board Company; J. J. Harrison, manager, paperboard division, Michigan Carton Company; O. E. Johnson, vice president-production, Bristol-Myers Products Division; John Kraus, Thompson Products, Inc.; John Ladd, General Box Company; Ernest H. Marks, director, selection of specialized personnel, Owens-Illinois; Paul Murphy, general manager, packaging market sales, Reynolds Metals Company; Clinton K. Royce, president, Clint Royce, Inc.; Henry G. Sommer, supervisor, packaging methods department, Oldsmobile Division, General Motors Corporation; Jerome H. Stone, vice president, Stone Container Corporation, and Milton Yezek, director of research, carton and container division, General Foods Corporation.

Members unable to attend included T. W. O'Neill, George F. Alger Company; Lloyd Stouffer, editor, Modern Packaging, and John A. Warren, American Management Association.

Faculty Participation

Faculty and staff members present included Dr. Richard M. Swenson, assistant dean of agriculture in charge of resident instruction; Dr. Roy E. Marshall, assistant director, agricultural experiment station; Dr. A. J. Panshin, head, department of forest products; Dr. Harold J. Raphael, assistant professor, department of forest products; Robert C. Clark, assistant director, placement bureau, and J. W. Goff, Instructor, Department of Forest Products.

Guests present and participating in the annual meeting included Carl Claus, R. A. Jones & Company, Inc.; William Hall, director of research, Folding Paper Box Association of America, and Frank Liebert, Great Lakes packaging sales manager, Reynolds Metals Company.

Among the most pressing problems facing the forthcoming executive committee is that of establishing and maintaining a means of handling the expected contributions. It has been suggested that it may prove appropriate to establish a packaging foundation. Such an organization would prove a convenient and legal repository of such donated funds.

Faculty representatives and committee members alike expressed interest in the prospect of such a foundation. However, both the university and its committee expect to explore all aspects of the matter before reaching any decision.

Still another area of interest is the matter of research. Although the packaging program has included both formal and informal research efforts, it is expected that a considerable volume of such research will accompany the enlargement of the entire packaging program. The university expects not only to continue the current work involving the agricultural experiment station — but also to accept industry-financed projects.

A Packaging Building?

A major handicap of the current program is its lack of adequate building space. In order to carry on the teaching and laboratory work, as well as the packaging research efforts, substantially more space will become imperative. Committee and faculty members speculated on the possibility of providing the packaging program its own building. Whether or not this will provide an appropriate project for the packaging foundation or its equivalent remains to be seen.

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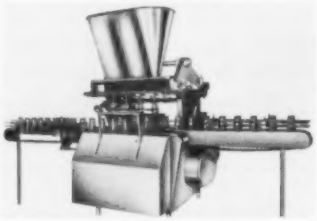
Piston Filler Machine

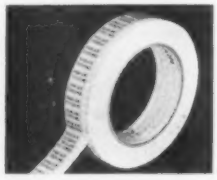
The Filler Machine Co., Inc. announces a piston filling machine that handles semi-liquids and semi-solids,



using containers from two ounces to quart and two-pound capacities. It operates at speeds from 60 to 88 containers a minute. The valve mechanism is designed for quick dismantling, cleaning and reassembling. Filler says that this machine fills by the bottom-up method, to eliminate air pockets and get a solid pack. Circle No. 1.

Printable Plastic Tape

Minnesota Mining and Manufacturing Co. has a new plastic tape designed for printing and die-cutting applica-



tions. This tape is 6.5 mils thick and has 150 per cent elongation at breaking. According to Minnesota Mining, the new tape has a tensile strength of 21 pounds per inch of width. It offers resistance to chemicals, heavy wear and limited weathering, the producer notes. Circle No. 2.

Aerosol Propellant Injector

JG Machine Works has a propellant injector for bottles and cans that handles up to 30 injections a minute, depending on the quantity of propel-

lant and container valve. It is air-operated and electrically controlled. Injection capacity ranges up to 300 cu. cm. of liquid, and injections down to five grams have been accurate to plus or minus .75 per cent, according to the producer. The machine has cycling devices to prevent a repeat injection without first removing the container and re-inserting it. Operations may be semi- or fully automatic. Circle No. 3.

Molded Cellulose Containers

Bemis Bro. Bag Co. reports that its molded cellulose containers are custom made of cellulose pulp. These

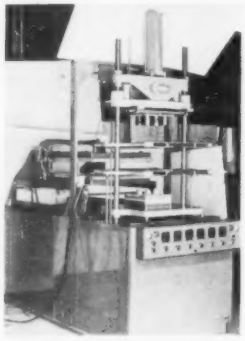
may be designed to provide partial or complete protection. There are molded caps and headers to shield protruding or fragile parts. These containers utilize tailored inserts to hold package items in suspension, protecting them from shock and package puncture. For complete protection a molded container fully encloses the product, nestling it between the pulp cushions. Circle No. 4.

Bag Sealer

Better Packages, Inc. announces its "Nike" bag sealer designed to seal polyethylene bags with pressure sensitive tape. A single downward motion accomplishes the sealing, with the tape being automatically cut off at the end of the downward stroke. The producer says that a peripheral tape roll guide centers the tape in the machine at all times. There is an automatic cut-off of a definite length strip. The machine is adjustable from one-quarter to one-half inch. Circle No. 5.

Vacuum Forming, Trimming Unit

Vacuum Forming Corp. says that its new "Vac-Trim" machine performs the entire fabricating process of vacu-



um forming, drape forming and trimming thermoplastic sheets. Its depth of draw is nine inches and the maximum mold area is 24 by 24 inches. The heater unit is of sandwich-type construction and the heater unit assembly is of a cantilever construction. The vacuum pump is directly connected to the machine through a vacuum surge tank and one-inch vacuum valve located directly beneath the platen. Circle No. 6.

Plastic Sheet, Bag Maker

Lectromatic Devices, Inc. announces its model S-1000 plastic sheeter and bag maker, designed to measure, cut and dispense flat sheets from roll

Lab tests prove new overwrap gives highest gloss at low cost

Readings taken with Photovolt Glossmeter show new coated paper matches gloss of laminated transparent stock.

Laboratory tests prove that the new overwrap coated with A-C* POLYETHYLENE-wax blends has a gloss rating equal to that of laminated transparent stocks. Yet it costs 40 to 50% less!

Despite this remarkably low cost, the overwrap coated with this A-C POLYETHYLENE blend is scuff-resistant, has a smooth plastic feel and is equal in quality of appearance to the more expensive types.

Paper converters using A-C POLYETHYLENE find that this low-molecular-weight, low-viscosity polymer improves the stock in many ways without major cost increases. Food wrappers are not affected by high food temperatures, nor will they crack or lose gloss at freezing temperatures. Packages stay sealed; the overwrap *does not wrinkle*, as transparent types do.

Write for information and samples of paper coated with blends containing A-C POLYETHYLENE or ask your paper converter for details.

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stock in length between three and 100 inches. According to the producer, the machine forms bags from roll stock, measuring, cutting and sealing one end. There is a tension control to prevent over-feeding. There is a dial control of size wanted, and the operation is automatic upon pushing a button after selecting bag size. Circle No. 7.

Bottom Stapling Unit

Container Stapling Corp. announces its model BSF, a foot-operated bottom stapler that has an interchange-

able arm and post. The arm permits setting up and stapling of telescope boxes, interior packaging, or other pieces. By means of the post the unit handles regular slotted or overlapped containers. The anvils are stationary, non-movable and of uniform size. Staple size: crown, 1⅜ inch; leg, ⅝ or ¾ inch. Circle No. 8.

Direct Impulse Counter

Post Machinery Co. says that its model F-2 Decitron direct impulse counter is designed for relatively slow

counting operations: It is designed to count continuously at speeds of five per second, and will count up to ten objects per second during sudden bursts. The producer reports that the counter may be as far away as 100 feet from the photohead without preamplification. This makes possible having the photohead in a highly confined space, and the six digit totalizer in any convenient position. Circle No. 9.

Bag Making Machine

The G. T. Schjeldahl Co. announces its Model 40-40 machine, designed to manufacture polyethylene bags by the side-weld method of construction. With this method two layers of polyethylene film are welded together by a hot knife at the sides of the bags. Schjeldahl says that this type of construction permits end-around and identical front and back printing of the bag. Single bag speeds are 40 to 120 a minute. Dwell time varies between 0.1 and ten seconds. Bag sizes range up to 40 by 40 inches. There are automatic edge guide and tension controls. Circle No. 10.

Heavy Duty Strap Cutter

A. J. Gerard and Co. says that its No. 550 heavy duty strap cutter slices through metal up to two inches by

.050 inch. There are metal feet on the bottom handle in order to steady the cutter and make possible a one hand operation. A new jaw designed contributes to this one hand use, according to the producer. Circle No. 11.

Matching Side Seams

Continental Can Co. announces that it now stripes the side seam of an aerosol container so that it matches

the background color of the can body. Currently, this development is available on Continental's six-ounce dome top style aerosol cans — 202x314. According to Continental the outside side stripe is split on end where tried, and no base coat is needed over the plane side seam metal. Circle No. 12.

Polyethylene Drum Closure

Rieke Metal Products Corp. says that its latest drum closure is a one-piece unit with the plug, flange and steel retaining ring completely assembled. Once opened, a drum is resealed by replacing the polyethylene plug in the plastic flange. The producer says that the closure is tamper-proof since the diaphragm of the flange must be removed in order to pilfer the contents of a drum. Dispensing pumps

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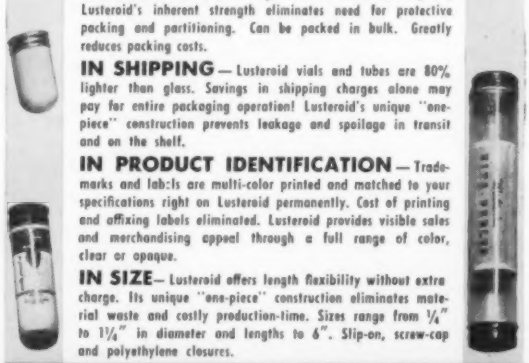
IN PACKING— Strong, resilient and shatterproof, Lusteroid's inherent strength eliminates need for protective packing and partitioning. Can be packed in bulk. Greatly reduces packing costs.

IN SHIPPING— Lusteroid vials and tubes are 80% lighter than glass. Savings in shipping charges alone may pay for entire packaging operation! Lusteroid's unique "one-piece" construction prevents leakage and spoilage in transit and on the shelf.

IN PRODUCT IDENTIFICATION— Trade-marks and lab:ls are multi-color printed and matched to your specifications right on Lusteroid permanently. Cost of printing and affixing labels eliminated. Lusteroid provides visible sales and merchandising appeal through a full range of color, clear or opaque.

IN SIZE— Lusteroid offers length flexibility without extra charge. Its unique "one-piece" construction eliminates material waste and costly production-time. Sizes range from ¼" to 1¼" in diameter and lengths to 6". Slip-on, screw-cap and polyethylene closures.



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of the two-inch size may be screwed directly into the flange. Circle No. 13.

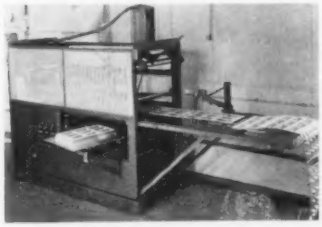
Color Tolerance Computer

Instrument Development Laboratories, Inc. announce a new electronic color tolerance computer. Used with a

colorphotometer, it computes deviations from color standard and presents the answer as a single number on a dial calibrated in National Bureau of Standards units. According to the producer the new computer is based on a new arrangement of the mathematics involved in the Hunter and Adams systems of color tolerance computation. Its range is from zero to 20 NBS units. Circle No. 14.

Vacuum Forming Machine

The Auto-Vac Co. announces a new "Skin-Pak" machine designed for packaging or low-profile (up to seven



inches) drape forming application. Materials up to 22 inches wide and .030 thick may be used. There is a device for pulling the formed plastic away from the molding area and simultaneously cutting the previously formed section from the roll. Using .010 cellulose acetate, one operator can produce three formings (20x25 inches) per minute. In a "Skin-Pac" operation one operator may handle two 20 by 25 inch cards (with multiple products) per minute. Circle No. 15.

Wood Veneer Panels

Weyerhaeuser Timber Co. announces new constructions of its "Ply-Veneer" for the packaging of industrial items. Latest additions include core thickness of one-tenth, one-eighth and three-sixteenth inch. The producer says these are available in three combinations of kraft linerboard facings — 42 pounds both sides, 42 and 90 pounds, or 90 pounds both sides. Facings are bonded cross-grain to the core with water-resistant glue applied under heat and pressure. Circle No. 16.

Can Delivery System

Crown Cork and Seal Co., Inc. announces development of a new can delivery system which uses just one man on the loading platform to put 1200 six-ounce cans a minute directly into a filling line. Specially-built can containers discharge by gravity to a cableway extension. There is a wheel boot device permitting transfer of loads from container to the extension. Circle No. 17.

Oil Barrier Parchments

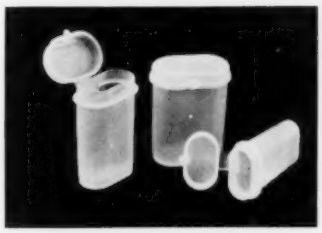
Paterson Parchment Paper Co. has a new grease resistant paper developed to stop the spread of silicone oils and resist their penetration. The basis weight is 27 pounds for 500 sheets, 24 by 36 inches. The producer suggests its use as an inner liner for bags of oily materials, as a laminant to cartons and spiral wound tubes, and as a drum and can liner. Circle No. 18.

Dripless Collapsible Tube

Aluminum Co. of America reports development of a tube designed to avoid excess flow of contents. It has a long nozzle crimped around the circumference about one-quarter inch below its open end. This crimp is a depressed annular ring which acts as a seat for the pointed end of the screw eye and also seals off the tubes contents from the nozzel tip. According to Alcoa, this tube eliminates the problem of reinserting a screw eye through beads of solidified contents. Circle No. 19.

One-Piece Plastic Container

Chase Manufacturing Co. announces a one-piece polyethylene container — in four, eight and twelve dram sizes.



Although designed primarily for pharmaceutical items, it is expected to have other applications such as for hardware, according to Chase. Since the cap is an integral part of the container it may be opened with one hand. Circle No. 20.

WRAP-ADE
high-speed UNIT PACKAGERS

WRAP-ADE Unit Packagers are versatile, low cost machines designed specifically for faster packaging with less waste. They perform an entire cycle of packaging operations including feeding, filling, forming and sealing practically every type of heat sealing materials.

UNIT PACKAGER with CONVEYOR FEED

For some packaging operations, this manually fed conveyor is the ideal feeding system. Among products adapted to this system are small textile products, flat food items, toys, bandages, or any other reasonably flat small product. *Other Unit Packagers available for almost any small item.*

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Padding Material

Jiffy Mfg. Co. folder ilustrates in detail three types of "rugated" padding materials. Designed to absorb shock and to protect products against abrasion, they are available in sheets or rolls. Circle No. 101.

Tape Dispensers

Nashua Corp. brochure lists line of four sealing tape machines that are manually or electrically operated. They handle tape widths from three-fourths to four inches. A method of case taping is illustrated in step-by-step diagrams. Circle No. 102.

Transparent Vials

Celluplastic Corp. offers a graphic bulletin showing types of transparent vials and closure styles available. Made of polystyrene or cellulose acetate, vials range from three-eighths inch diameter by three-fourths long to one and three-fourths diameter by five inches long. Circle No. 103.

Dry Product Packaging

Pneumatic Scale Corp. Ltd. Bulletin No. 111 gives specifications and floor plans for high speed machines that net weigh, fill and top and bottom seal cartons. Package makers that form and combine cartons and liners are also shown. Circle No. 104.

Cosmetic Aerosol Propellants

The Kinetic Chemicals Div. of the Du Pont Co. offers Technical Memorandum No. KTM-18. It provides test data on low pressure aerosols for glass packaged colognes. It reviews materials, pressure, spray pattern, solubility, and flammability. Circle No. 105.

Edge Gluer

Potdevin Machine Co. has a booklet that describes the uses and operation of a machine that applies liquid adhesives in strips to flexible or rigid packaging materials. Circle No. 106.

Humidity Indicator

Kehr Products Co. offers a handy indicator that registers relative humidity in storage or packing rooms. It contributes to the efficiency of packaging materials by indicating "safe" or "too humid" atmosphere. Circle No. 107.

Packeting Machine

Brown Bag Filling Machine Co., Inc. "Formapak" brochure illustrates operation and uses of a "one station" forming and filling machine for free flowing powders. Unit handles paper of film packets from two by two and a half to four and a half by five inches and up to one ounce in weight. Circle No. 108.

Handling Acetate Film

Celanese Corp. of America Bulletin C-12 furnishes details concerning how to handle acetate film in the plant. It lists handling methods that are designed to increase production yield and lower operating costs. Circle No. 109.

Round Bottle Labeler

New Jersey Machine Corp. features its "Pony 165" labeler in an illustrated brochure. Specifications, flow and floor plans are shown for this machine which automatically labels round bottles up to 165 per minute. It handles bottles one-half to three and a half inches in diameter. Circle No. 110.

Wrapping And Bundling Adhesives

Paisley Products, Inc. Bulletin No. 25 explains and pictures different wrapping methods used in various industries. Conventional papers, films and machines available are described as well as the characteristics of 20 Paisley adhesives used for wrapping and bundling. Circle No. 111.

Automatic Wrappers

Scandia Mfg. Co. offers a data sheet giving complete specifications for Scandia Model "SF" fully automatic wrappers with speed ranges from 150 to 250 packages per minute. Circle No. 112.

Polyethylene Bags

The Visking Corp. has a concise folder, "It's Not The Price Of The Bag". It enumerates nine factors to be considered in determining the actual cost of printed polyethylene bags. Circle No. 113.

Carton Set-Up Machine

E. L. Bivans, Inc. describes its "Model 50" automatic carton set-up machine in a four-page bulletin. Unit is portable and produces up to 4,000 cartons per hour. Sizes handled range from three-eighths by seven-eighths by one and one-fourth to three and a half by five by twelve inches, with 20 minutes allowed for change-over. Circle No. 114.

Bottle Labeling Adhesive

Swift & Co. folder describes properties and uses for three grades of adhesive for jar and bottle labeling. It is adapted to semi-automatic or automatic equipment as well as hand labeling operations. Handling suggestions are listed. Circle No. 115.

Case Sealer

A-B-C Packaging Machine Corp. offers an illustrated data sheet that describes company's "Junior" semi-automatic case sealer. Although small in size, machine can top seal or top and bottom seal most case sizes without disturbing the contents. Circle No. 116.

Cellophane Overwraps

Olin Film Division brochure outlines economy of cellophane over-wrapped trays compared to other package types in the candy, baking, novelty and prepared meat industries. Circle No. 117.

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AUTOMATIC PACKAGING

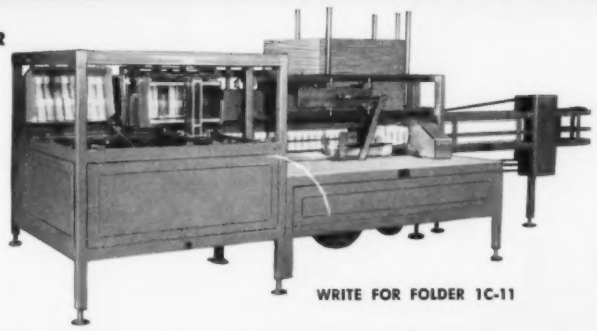
Whatever your shipping container requirements, there's a custom-engineered PACKOMATIC machine to reduce production costs and increase daily output.

For multiple loading of Simoniz liquid wax, a PACKOMATIC Automatic Case Opener and Loader — one of several PACKOMATIC machines used by Simoniz — sets up flat-corrugated cases for automatic loading. Another PACKOMATIC machine imprints lot numbers and shipping data on four sides before discharging carton to a PACKOMATIC Case Sealing machine. Fully-automatic, of course.

But regardless of your equipment budget or the degree of automation you require, there's a PACKOMATIC that can pay its way quickly in your plant. There's a machine to open cases, or load, or seal or imprint — or do any combination of these operations.

AUTOMATIC CASE OPENER AND LOADER

Depending upon the size unit to be loaded, proportion and packing arrangement of the cases, you can package 20 or more cases per minute on this machine, custom-engineered by PACKOMATIC to your needs. Multiple tier loading is used for packing such varied items as breakfast cereal, petroleum products, synthetic detergents. Phone collect, or write for literature about the advantages and economy of PACKOMATIC packaging.



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Other PACKOMATIC machines include the Bale Sealer — Case Sealers — Opener-Loaders — Case Imprinters — Telescoping Volumetric Filler — Packer-Gluers. Units available, semi-automatic or fully-automatic depending on your needs.

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New York, Chicago, Cleveland, Boston, Tampa, Baltimore, Portland, Denver, Los Angeles, San Francisco, Seattle, New Orleans, Louisville, Kansas City and all principal Canadian cities.

Liquid Fillers

Horix Mfg. Co. illustrated Bulletin No. 155 is a digest of 13 models of company's fillers for still liquids or semi-liquids. Accuracy of fill is guaranteed to plus or minus 1/64" at any speed, handling container sizes of one ounce to five gallons. Circle No. 118.

Fibre Cans

Cleveland Container Co. has a comprehensive brochure showing detailed pictures and specifications for eight types of metal tops and 13 styles of fibre cans and tubes that are available. Circle No. 119.

Viscous-Liquid Fillers

Karl Kiefer Machine Co. describes its line of liquid and viscous product filling machines, and bottle cleaners in a four-page illustrated folder. Circle No. 120.

Corrugated Boxes

Hinde & Dauch offers a booklet, "Creative Package Design" which includes a check list with which to rate your own packaging program. It also shows 60 different styles of corrugated devices used to cushion, brace, cradle and shield merchandise. Circle No. 121.

Outsert Applicator

The Pfaudler Co. has a data sheet describing a new machine that attaches outserts, up to 220 a minute, to cylindrical containers of glass, plastic, metal or paper. Pictures, specifications, elevation and floor plans are included. Circle No. 122.

Strong Sealing Tape

Mid-States Gummed Paper Co. offers a technical data sheet No. 16-35, 16-36. It lists physical features and packing specifications for this company's glass reinforced "Tuf-Tape", and shows results of tumble tests made with loaded, taped cartons. Circle No. 123.

Packaging Machinery Catalog

Wright Machinery Co. describes its diverse line of equipment in a 24-page catalog. Well illustrated, it gives standard specifications for weighers and fillers of dry free-flowing products for cartons and bags, as well as cracker sandwich wrappers, and a liquor bottle strip stamp machine. Circle No. 124.

Interior Packaging

Kimberly-Clark Corp. describes "Kimpak" cushioning material in a twelve-page brochure. Profusely illustrated with examples of blocking and bracing, flotation, absorbent packing and surface protection, this booklet contains a variety of information. Circle No. 125.

Cartoners

R. A. Jones & Co., Inc. describes its fully automatic and semi-automatic cartoning machines in a four-page illustrated folder, which includes a listing of 129 users of this equipment. Circle No. 126.

Label Pasters

Kenneth J. Moore & Co. offers a bulletin describing the "Gluemaster" label paster with pictures and specifications for eight different models. Applying adhesive to labels in widths ranging from six to 18 inches, these machines are available in motor driven or hand operated types. Circle No. 127.

Versatile Packager

The Bell Machine Co. brochure outlines the "Bell-Pak" which will form, fill and heat-seal flexible materials at speeds up to 400 packages a minute. Adaptable to solids, liquids or powders, machine simultaneously handles different items and different sizes. Package lengths are between one and three-fourths and 14 inches, and widths range from one and three-fourths to nine inches. Circle No. 128.

Scales

The Exact Weight Scale Co. has an illustrated folder that lists specifications for 15 models of this company's "Shadograph" scales. These scales project an indicator shadow on an illuminated dial giving a true reading from any angle. Circle No. 129.

High Speed Wrapper

Hudson-Sharp Machine Co. illustrates 13 models of its Campbell Wrapper in a current booklet. This machine tube-forms material around a product, then simultaneously crimps, cuts, heat or glue seals, folds and delivers up to 300 units a minute. Circle No. 130.

Label And Carton Presses

New Era Mfg. Co. offers a brochure on its high speed flat-bed printing press that prints and die cuts labels, tags and small cartons delivering them in rolls or individually cut off. This letterpress unit uses electros, type, plastic or rubber plates. Circle No. 131.

Heat Sealer And Labeler

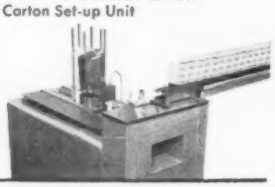
Doughboy Industries, Inc. has a brochure explaining with pictures, mechanical drawings and floor plans the operation of its rotary heat sealer and labeler. This unit automatically heat seals and labels bags up to 60 a minute. Coding and hole punching devices are available as accessories. Circle No. 132.

Unitized Reverse-Tuck Cartoning Equipment

For continuous packaging production combined with versatility investigate the BIVANS line of packaging machines.

Send us your cartons for engineering analysis.

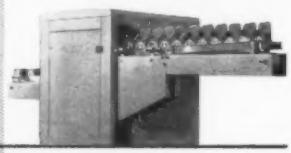
Model 54 CONVEY-O-MAT Carton Set-up Unit



Model 50 TUCK-O-MAT Carton Set-up Unit

Model 321 PRINTER-CODER Attachment

Model 518 CARTON-CLOSER UNIT



BIVANS, Inc. 2431 Dallas Street Los Angeles 31, California

See us at booth 406 at the Packaging Machinery Manufacturers Exposition in Cleveland, Sept. 11, 12, 13 and 14.

DIST. BY NEW JERSEY MACHINE CORP., HOBOKEN, CINCINNATI, CHICAGO, LOS ANGELES

Forms, Fills And Seals

Hayssen Mfg. Co. describes the "Compak" machine in an eight-page booklet. The equipment automatically packages solids, powders or liquids in all heat sealing roll stocks or laminations. Two, four or six packages can be produced simultaneously. Circle No. 133.

Carton Forming And Gluing

Peters Machinery Co. has a bulletin reviewing the Model SG automatic carton and tray forming and gluing machine. It sets up a wide range of top-opening, hinged cartons or trays, and handles carton blanks from six to 18 inches long and from six and a half to 19 inches wide at speeds up to 175 per minute. Circle No. 134.

Auger Feed Attachment

Package Machinery Company's four-page bulletin describes, with pictures and diagrams, its auger feed device for use with the Transwrap packaging machine. This unit is designed to feed and measure "hard to move" powders and for products requiring gas packaging. Speed ranges from 40 to 100 measures per minute. Capacity is rated up to one pound. Circle No. 135.

Case Imprinter

J. L. Ferguson Co. has an automatic shipping case imprinter that is reviewed in a current data sheet. Equipped with automatic inkers, unit will print on one, two, three or all sides of a case at speeds to 20 boxes per minute. Circle No. 136.

Liquid Filler

Elgin Mfg. Co. offers an illustrated data sheet with specifications on its "Speed-King" two-valve filler. Machine fills liquid or semi-liquid products in jar or tins from one ounce to one gallon at speeds ranging from 18 to 126 containers per minute. Circle No. 137.

Economical Packager

Triangle Package Machinery Co. brochure describes the "Elec-Tri-Flex" machine which forms, fills and seals bags at speeds of 30 to 50 per minute. It handles solids, powders or liquids. Circle No. 138.

Package-Top Labeler

Oliver Machinery Company's illustrated data sheet describes its new 804-B automatic "Package-Top" Labeler, which applies thermoplastic labels. It features accurate label registration directly on the package or on cellophane, glassine, wax or kraft paper overwraps. Speed ranges from 40 to 80 packages per minute. Circle No. 139.

Polyethylene For Coatings

Semet-Solvay Petrochemical Div. of Allied Chemical & Dye Corp. describes its A-C polyethylene for wax coatings in Bulletin 116. Its hardness and resistance to water and most chemicals at room temperature adapt it to wax coatings for milk cartons, paper cups, corrugated board, bread and frozen food wrappers. Circle No. 140.

Polyethylene Sealing

The Polychemicals Dept. of the Du Pont Co. outlines seven methods used in sealing polyethylene in Information Bulletin No. X-5b. Sealing equipment suppliers are listed as an added convenience. Circle No. 141.

Squeeze Packages

Bradley Container Corp. has published a news letter "Bracon Briefs," describing company's polyethylene squeeze tubes, bottles and cans. A size-capacity table is included. Circle No. 142.

Humidity Indicators

The Desiccant Div. of Culligan, Inc. has issued a product information bulletin that describes six kinds of spot humidity indicators. They are used in dehydrated military packaging, providing a visual means of determining the humidity condition within moisture protected packages. Circle No. 143.

Filling Control

Crown Can Div. of Crown Cork & Seal Co., Inc. has a new folder that lists the advantages of its automatic fill controll unit for liquid or semi-liquid products. Preventing over-fill, this device automatically corrects, for temperature fluctuations, the amount of product delivered to each container. Circle No. 144.

Polyethylene

The Plastics Dept. of The Dow Chemical Co. describes Dow Polyethylene 500E in an eight-page booklet. Defined as a polymer designed for the extrusion of tubular or blown film, its physical and chemical properties are enumerated. Circle No. 145.

Bottle Labeling

National Adhesives offers a 36-page booklet, "Successful Bottle Labeling". It discusses such subjects as labeling methods, package selection, label specifications, grain determination, adhesive considerations, water resistant and thermoplastic labeling, adhesive handling, machine care, and examines 14 labeling difficulties. Circle No. 146.

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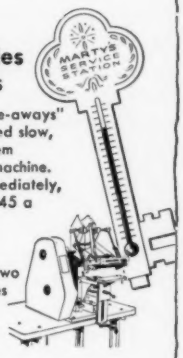
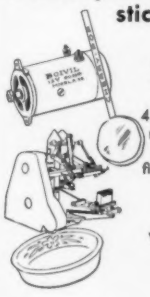
MARKEM
solved these marking problems

plastic novelties in three colors

Imprinting plastic "give-aways" on a hand press proved slow, poor in quality. Markem suggested their 45A machine. Quality improved immediately, production jumped to 45 a minute per color run. Result was better product, increased business, purchase of two more Markem machines to meet demand.



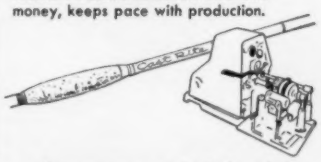
odd shapes . . . from lollipop sticks to solenoids



Object size, shape or irregularity often makes efficient marking a real problem. Markem's 45AG machine is proving remarkably versatile for marking plumbing fixtures, automotive parts and ignition coils . . . lollipop sticks, recessed lids and brushes. Well worth investigating for any difficult job.

fishing rod imprinting

Advantages of directly imprinting products are typified by a manufacturer who had been using decals on his fishing rods. A Markem 61A machine now imprints 600-700 rods per hour, of varying diameters and lengths. Markem Method saves him time and money, keeps pace with production.



Compare your method of product or package marking with the *Markem Method*. Write Markem Machine Co., Keene 20, N. H.

MARKEM ...TO MAKE YOUR MARK

The engineering of a package

(Continued from Page 11)

neering thinking which are the bases of almost all technological advances. It contains a brand new concept in pie plate packaging not even thought of at the beginning of its development.

Who should get the credit for the development of the new package? Should it be management who, in asking its uppermost question, started the ball rolling? Should it be the package engineering department where the original untried idea was conceived? Should it be the production department who refused to accept an untried idea but willingly aided in the introduction of the resulting package? Should it be in the warehousing group who carried on the important warehousing tests and highlighted the weakness in warehousing ability?

Each and every department played a part in the development of the final package, so in reality no one person or group can claim the glory alone. This is just another example of a team at work, each member doing his part in the unending struggle to find the answers to management's uppermost question, "What can be done to reduce costs?"

Using men to operate packaging line machinery

(Continued from Page 14)

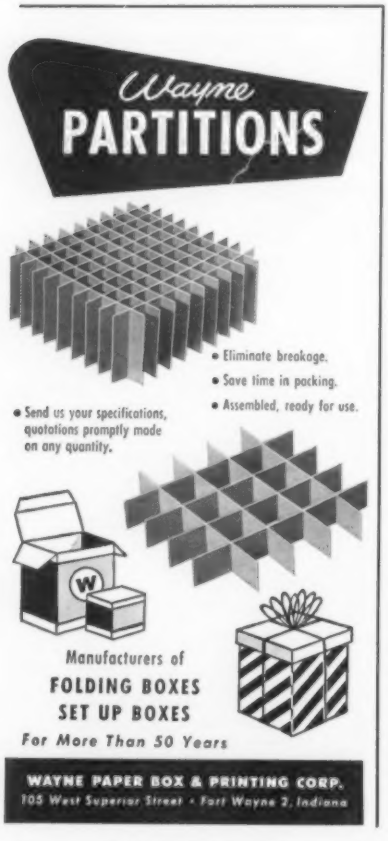
done and the training will be better when higher speed machine acquirements are made.

Occasionally, visitors to our plant have witnessed a sudden stoppage of a machine and they have expressed amazement at the way the other operators continue to run their equipment and pull off the surplus until the unit that is down gets back into operation. No coercion is made on our part in this spontaneous reaction. It is strictly reflex, the foundation being based on the strong desire to have a high efficiency rating.

Visit Supplier Plants

Another policy in effect in our company is that each operator visit as many plants of our suppliers as is possible. Most of our men have seen glass made, plastic caps molded, folding boxes printed and fabricated, also labels printed and corrugated shipping cartons made. Background and knowledge are necessary requisites for job interest in managerial and administrative positions, and there is no reason to believe it is otherwise in factory jobs. We have found that these visitations have built up job interest, have proved to be a source of ideas for improvement changes, permit the operator to describe defects in packaging materials much more precisely, and lastly, they have served to enhance the prestige of the employee with his family, friends and fellow workers. In our opinion, however, it would be less effective and more delicate to administer with women.

Using exactly the same equipment, but improving the speed, we have increased our daily output from 52,000 unit per line in 1952 to 64,000 units in 1956. There have been many reasons, such as more consistent quality of our packaging materials and many small mechanical improvements by our equipment manufacturers, but the point is, that while these things cannot be attributed to the machine attendants, we certainly would not have been able to take the best advantage of them unless our men were capable.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For More Than 50 Years
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Our classified advertising section is intended for use by those wishing to buy or sell used packaging equipment, to employ packaging personnel, seek such employment, offer or seek business opportunities. It is not available for general advertising. Terms: Cash with order. Rates: Up to 60 words, $10.00. If boxed, $20.00. Up to 120 words, $20.00. If boxed, $40.00. Up to 180 words, $30.00. If boxed. $60.00.

Circulation this issue in excess of 35,000

MATERIAL WANTED

Plastic Scrap Wanted — We need Polyethylene film and chunk scrap for our own production. Please let us know what you have to offer. Prompt quotations given. Address: Erie Plastics Company, 1059 Buffalo Road, Dept. PT, Erie, Pennsylvania.

FOR SALE

For Sale — New Doughboy Portable Band Sealer, Model #PHS-C. $150.00. Reply to: Knickerbocker Rubber Co., 6101 S. May Street, Chicago 21, Illinois.

For Sale — 2,000,000 bags Silica Gel (5 gram cloth bags) original Davison's Protek-Sorb, Prime Quality, Bargain Price. Address replies to Box 801, PACKAGE ENGINEERING, 1791 W. Howard Street, Chicago 26, Illinois.

FACILITIES AVAILABLE

Open Time on Powder Line — Pneumatic 2 scale line with top and bottom sealer and aluminum seal spout inserter. Hayssen Wrapping Machine with automatic Elliott case sealer. 40 to 60 per minute. Also warehousing, drop shipments — bills of lading and office space available. Reply to: Paket, Inc., 9022 South Baltimore Avenue, Chicago 17, Illinois.

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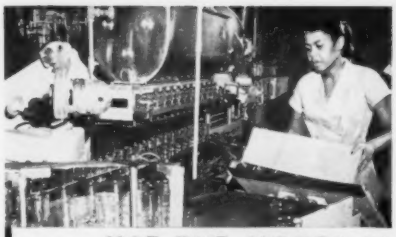

A complete Filler Machine Co. line at Brook-Maid Co., Inc., Brooklyn including unscrambler, cleaner and straight line filler filling jams, jellies and preserves.

USE THE MODEL SL-55

To Fill Semi-Liquids, Semi-Solids

You'll get *more accurate filling, quicker cleaning, faster change over* when you use a Filler Model SL-55 piston type automatic filler!

- they handle from 2 oz. to quart and 2 lb. containers, fill food, dairy, paint and chemical products.
- positive accurate filling is assured every time because valves are air-free and pallets are air operated
- a "no container, no fill" feature saves the product from being wasted and keeps the machine clean
- you get faster, easier cleaning since the valve mechanism can be dismanled quickly
- all contact parts and parts around the filling zone are 18-8 stainless steel
- speed of fill is from 60 to 300 containers per minute, depending upon size of machine.

Get further details today on this model or our other models of filling machines and let us bid on your job.

The **FILLER MACHINE CO., INC.**
the original builder of Philadelphia piston fillers
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Package Engineering
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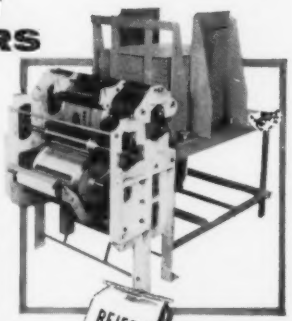

With the new, modern Autoprinter, you date, mark or code multiwall bags and containers as you need them! Completely automatic and electronically controlled, the Autoprinter works right with your production line . . at up to 3,000 impressions per hour!

Investigate how the Autoprinter can speed your operation, save container pre-printing and storage costs, and eliminate costly manual marking expense.

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What we think

Perhaps no industry-college combination in the country has a brighter future than that consisting of Michigan State University and the field of technical and operational packaging. Of course, no one has a monopoly on the educational market, and undoubtedly other packaging courses will flower and develop.

Indeed, promising courses at Columbia, Wayne and Purdue Universities, among others, are already going strong. But as the sponsor of the first four-year course in packaging technology, Michigan State holds a unique trusteeship.

Having experienced remarkable growth in student body and physical equipment, although with small growth in the teaching faculty, the packaging program at the university now stands at the gateway to a great opportunity: To be the nation's (even the world's) leading source of college trained packaging experts — provided that those guiding the program meet this challenge.

At first glance, the solution to Michigan State's basic problem looks quite simple: Enlist large scale financial support from suppliers and users of packaging. On one hand is the university — with its evident need of money for the expansion of this program. On the other hand is a number of companies throughout industry — with large amounts of money available for the financing of educational efforts. Therefore, to the casual observer the whole thing boils down to the comparatively easy job of moving the money from one hand to the other.

But any sophisticated corporate executive knows only too well that company-contributed money, however readily *available*, comes forth only when there is a thorough and articulate presentation of the need for the contribution. In other words, Michigan State (or any other institution seeking to launch a packaging program in a large way) will have to prove its case beyond a reasonable doubt.

The industry advisory committee, representing both users and suppliers, stands hand in hand with the university officials as they plan the expansion of their courses. This committee will have an increasingly important role as time goes on. Individually and collectively, its members strive to sell the entire packaging field on the need of expanding the course, as well as to furnish the university a diversified industry viewpoint on curriculum guidance.

These committee members and the men teaching the packaging courses are going to pool their talents to build an effective presentation — as an aid in winning the enthusiastic approval and support of the men who sign the checks. This presentation will be an articulate statement of the needs of the program, and a review of the university's detailed plans for meeting those needs.

Even with this help, in last analysis, the responsibility for emphasis and direction of the expansion effort rests on the shoulders of those on the teaching firing line. No one realizes this better than they. They are rising to the occasion and are growing in their concepts of their jobs and in their own grasp of the program. But these dedicated teachers are driving down a highway no one has been down before. They need and deserve all the support and encouragement our field can provide.

Thus far, the development of the packaging curriculum has focused upon (1) getting a suitable course content, (2) attracting an adequate number of high caliber students and (3) acquiring sufficient laboratory equipment to meet current needs. Results of this three-way effort are impressive: The present course content has been revised several times and represents probably the best possible use of the available courses. The student body has increased from a mere handful to a record-breaking 103. Finally, some $44,000 (including not only cash but also specific equipment) has been or will be spent on laboratory or similar facilities.

However, even this Herculean effort is rapidly proving inadequate. The time is at hand to talk about a curriculum utilizing several hundred thousand dollars' worth of facilities and manpower. It is imperative to start thinking in these larger terms. Nothing less will do. Keenly aware of their task, the teaching faculty and its industry advisory committee are planning to move ahead. The packaging field must support their efforts if it is to have the necessary future supply of trained packaging personnel.

Meanwhile, we await with interest the word from the university and the industry advisory committee. They are now crystalizing the broad outlines of future growth of this landmark program. What they do today will shape the development of the packaging experts of the future.

Bruce Holmgren

Editor

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Requests for reservations should include 1st, 2nd, and 3rd choices of hotels: type of room desired; and arrival time. Cleveland hotels listed by the Housing Bureau are:

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Auditorium Hotel
Bolton Square Hotel
Carter Hotel
Cleveland Hotel
Commodore Hotel
Hollenden Hotel
Manger Hotel
Olmsted Hotel
Park Lane Villa
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St. Regis Hotel
Sovereign Hotel
Statler Hotel
Stockbridge Hotel
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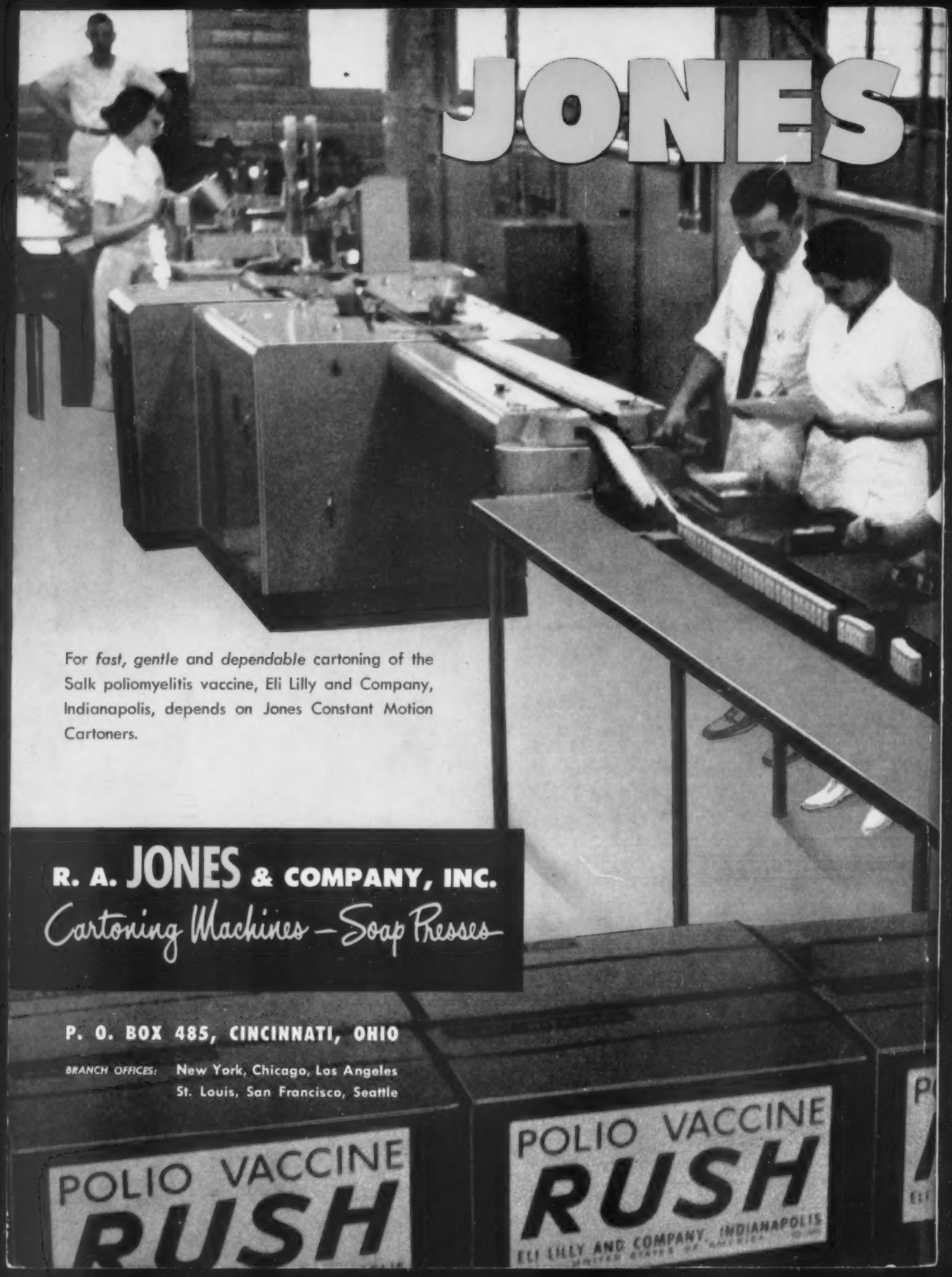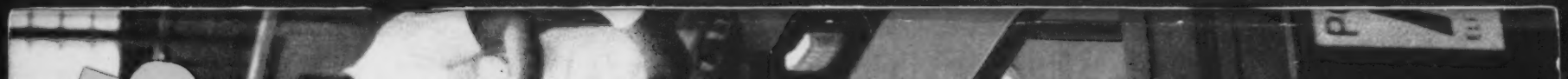
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